DOCUMENT RESUME

ED 139 931 CE 010 949

AUTHOR McMinn, Robert
TITLE Business Machine Maintenance. Performance Objectives. Basic Course.
INSTITUTION Duval County School Board, Jacksonville, Fla.
PUB DATE Dec 74
NOTE 79p.; Several illustrations will not reproduce well due to faint broken type ; For related document see CE 010 948

EDRS PRICE MF-$0.83 HC-$4.67 Plus Postage.
DESCRIPTORS *Behavioral Objectives; *Career Exploration; *Criterion Referenced Tests; Curriculum Guides; *Maintenance; *Office Machines; *Repair; Secondary Education; Semiskilled Occupations; Service Occupations; Skill Development; Student Evaluation; Trade and Industrial Education

ABSTRACT

Several intermediate performance objectives and corresponding criterion measures are listed for each of 25 terminal objectives presented in this guide for a basic business machine maintenance course at the secondary level. (For the intermediate course guide see CE 010 948.) The materials were developed for a two-semester (2 hour daily) course designed to provide training in the overall operations of business machines (function and repair of parts). Areas covered include understanding of theory movement, standard adjustments, alignment, type soldering, oiling procedures, and troubleshooting for electrical and mechanical machines. Titles of the 25 terminal objective sections are Orientation, Shop Layout and Tools, Basic Information, Pitch Information, Type Bar Soldering, Typewriter Carriage, Escapement, Segment Assembly, Ribbon Mechanisms, Tabulation Unit--Underwood Typewriter. Use and Features, Power Transmission, Power Shaft and Cams, Type Action Mechanism, Ribbon Lift and Feed Mechanism, Segment Shift Mechanism, Impression Control Mechanism, Backspace Mechanism, Input Control, Space Bar Mechanism, Carriage Tabulation Mechanism, Electric Margin, Carriage Return Mechanism, Half Spacing, and Troubleshooting. (This manual and 54 others were developed for various secondary level vocational courses using the System Approach for Education (SAFE) guidelines.) (HD)

****
* Documents acquired by ERIC include many informal unpublished *
* materials not available from other sources. ERIC makes every effort *
* to obtain the best copy available. Nevertheless, items of marginal *
* reproducibility are often encountered and this affects the quality *
* of the microfiche and hardcopy reproductions ERIC makes available *
* via the ERIC Document Reproduction Service (EDRS). EDRS is not *
* responsible for the quality of the original document. Reproductions *
* supplied by EDRS are the best that can be made from the original. *
****

ED139931

Business Machine Maintenance

PERFORMANCE OBJECTIVES

BASIC COURSE

BE CIC 6467

2

DUVAL COUNTY SCHOOL BOARD

Dr. John T. Gunning

Superintendent of Schools

DUVAL COUNTY SCHOOL BOARD

Mr. William E. Carter, Chairman
Mr. Wendell P. Holmes, Jr., Vice Chairman
Mr. Joseph Cullen
Mr. James S. Hornsby
Mr. William S. Mathias, Jr.
Mrs. Gene W. Miller
Mr. Nathan Wilson

Dr. Donald W. Johnson

Associate Superintendent, Curriculum

Mr. David S. Rigsby

Director of Vocational-Technical Education

Mr. Charles L. Downing

Supervisor of Vocational-Technical Education

Mr. David A. Brown

Supervisor of Industrial Education

Duval County Public Schools

Revised: December, 1974

ACKNOWLEDGEMENTS

This manual was developed using System Approach For Education (SAFE) guidelines.

Appreciation and recognition are extended to the following educators who have assisted in the preparation of this manual:

Mr. Art Hilton, Coordinator
School Industry Education

Mr. Joseph Killough, Coordinator
School Industry Education

Mr. Charles Downing, Supervisor
Vocational-Technical Education

The following educator participated as the writer of this manual:

Mr. Robert McMinn, Instructor

Cover design and printing by Mr. Chester Seivert

Typist: Linda Creech

BUSINESS MACHINE MAINTENANCE-BASIC
Accreditation No.: 9143
Length of Course: 2 Semesters
Time Block: 2 Hours

COURSE DESCRIPTION

This course provides training in the overall operations of business machines; course includes function of parts and repair of same. It also covers understanding of theory movement, standard adjustments, alignment, type soldering, oiling procedures, and trouble shooting for electrical and mechanical machines.

BUSINESS MACHINE MAINTENANCE-BASIC

Syllabus of Terminal Performance Objectives

0.0 Curriculum Objective
1.0 Orientation
2.0 Shop Layout & Tools
3.0 Basic Information
4.0 Pitch Information
5.0 Type Bar Soldering
6.0 Typewriter Carriage
7.0 Escapement
8.0 Segment Assembly
9.0 Ribbon Mechanisms
10.0 Tabulation Unit - Underwood Typewriter
11.0 Use and Features
12.0 Power Transmission
13.0 Power Shaft & Cams
14.0 Type Action Mechanism
15.0 Ribbon Lift & Feed Mechanism
16.0 Segment Shift Mechanism
17.0 Impression Control Mechanism
18.0 Backspace Mechanism
19.0 Input Control
20.0 Space Bar Mechanism
21.0 Carriage Tabulation Mechanism
22.0 Electric Margin
23.0 Carriage Return Mechanism
24.0 Half Spacing
25.0 Trouble Shooting

COURSE: BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE OBJECTIVE NO. 1.0. Orientation

Upon completion of the unit on orientation, the student will pass a teacher made test with 75% proficiency on school rules, shop safety and shop rules. Successful completion of each I.P.O. criterion measure will denote success of this T.P.O.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
1.1	Upon completion of the orientation presentation on school rules, the student will achieve 75% proficiency on a teacher made test.	1.1	Mark True or False 1. Shirts must be worn with trousers or shorts. 2. Hats, caps, etc. will not be permitted to be worn inside the building. 3. Shoes or sandals must be worn at all times. 4. Swim wear or physical education shorts shall not be worn into class rooms.
1.2	Upon completion of an orientation presentation on shop safety, the student will attain 75% average on a teacher made test.	1.2	Mark True or False 1. Safety glasses must be worn when using the electric grinder. 2. It is permissible to dry your hands by using the pressure air hose. 3. Do not turn on the exhaust fan while washing a machine. 4. You do not have to wear safety glasses while washing a machine in the cleaning tank.
1.3	Upon completion of presentation on shop rules, the student will with 75% proficiency pass a teacher made test.	1.3	Mark True or False 1. Throwing of metal objects will result in you receiving a referral to the dean. 2. Horseplay or skylarking with the trouble lamps will not be tolerated.

COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE OBJECTIVE NO. 1.0 (cont'd) Orientation

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		1.3	3. Should you report to class tardy three times within a grading period you will receive a referral. 4. Only one person at a time will be allowed to use the pressure air hose to "blow" out a machine.

COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE OBJECTIVE NO. 2.0 Shop Layout & Tools

Upon completion of unit of instruction concerned with shop layout, history and equipment, the student will attain 75% average on each I.P.O. criterion measure.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
2.1	Upon completion of unit of instruction dealing with history of the typewriter, the student will achieve 75% average on a teacher made test.	2.1	1. What is meant by "blind writers"? _____ _____ _____ _____ _____ 2. In what year was the first commercial typewriter manufactured? A. 1893 B. 1873 C. 1878 3. What company manufactured the first commercial typewriter? A. L.C. Smith B. Remington C. Underwood 4. Who is known as the "father" of the first commercial typewriter? A. L.C. Smith B. Remington C. C.L. Sholes
2.2	Upon completion of unit of instruction on equipment used in servicing machines, the student will identify four out of five pieces of equipment on a chart furnished him.	2.2	Identify the equipment on the attached chart.
2.3	Upon completion of unit concerned with a starter tool set, the student will	2.3	Put a check by the ones that you feel should be included in a starter tool set.

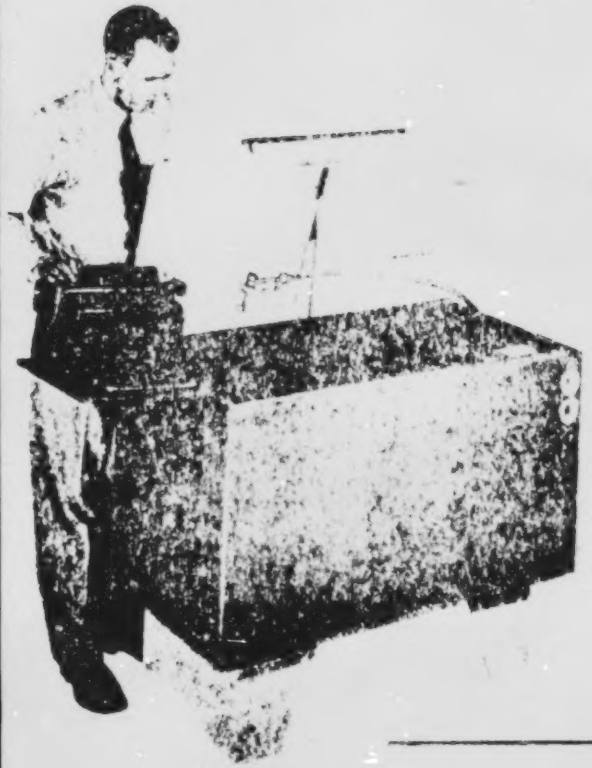
COURSE BUSINESS MACHINE MAINTENANCE-BASIC

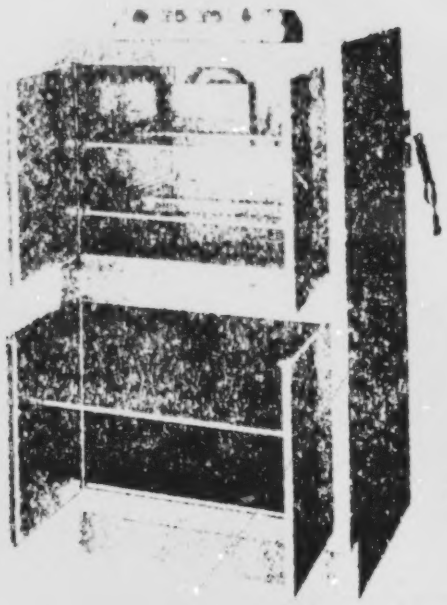
TERMINAL PERFORMANCE OBJECTIVE NO. 2.0 (cont'd) Shop Layout & Tools

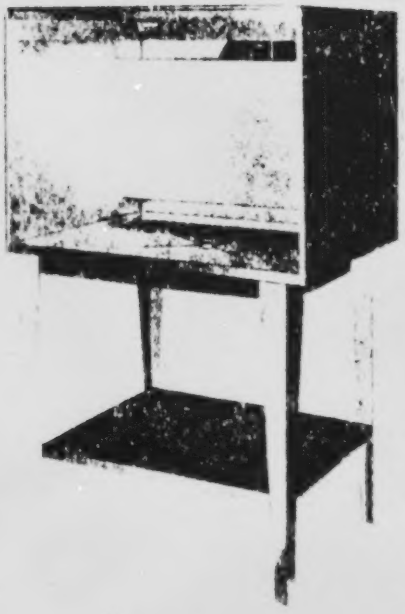
NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
2.3	identify at least 10 out of 12 on a list furnished him.	2.3	1. Spring hook set 2. Segment pick 3. Turn table 4. Bender 5. Oiler 5-1/4" 6. Work bench 7. Tweezers 8. Screw drivers (3) 9. Hammer 10. Bristol driver kit 11. Spring clip push and pull 12. Underwood spline wrench
2.4	Upon completion of unit of instruction dealing with setting up a shop, the student will attain 75% proficiency on a teacher made test.	2.4	1. What should you put a plastic bag on machines that will not be returned immediately? 2. What should you have an outside entrance to the service department? 3. When setting up a shop, the repair departments should be: A. Separate from the cleaning room. B. Together with the cleaning room. C. All one part of the cleaning room. 4. A "model" shop should consist of: A. Two rooms B. Three rooms C. Four rooms

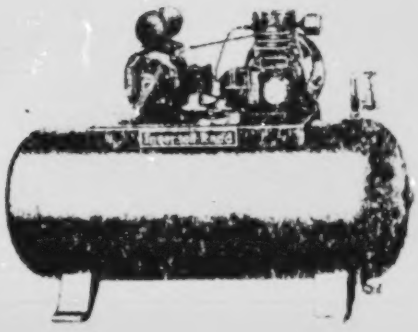
EQUIPMENT

used in servicing machines









COURSE: BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE OBJECTIVE NO. 3.0 — Basic Information

Upon completion of the unit of instruction covering steps to clean, oil, and adjust a typewriter, refinishing the case, refinishing scales, the student will achieve 75% proficiency on each I.P.O. criterion measure.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
3.1	Upon completion of unit of instruction covering Clean, Oil and Adjust, the student will list nine out of ten steps to a complete Clean, Oil and Adjust.	3.1	1. Name, in order, the 10 steps in the C.O.A. sequence. 1. _____ 2. _____ 3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____ 9. _____ 10. _____
3.2	Upon completion of unit of instruction covering refinishing of case, the student will attain 75% proficiency on a teacher made test.	3.2	1. The first step in refinishing a typewriter is to: A. Sand the rough areas. B. Clean, oil and adjust. C. Spray a cover coat over the machine. 2. When spraying with a spray can, hold the can: A. 6 to 10 inches from the object. B. 2 feet from the object. C. 12 to 18 inches from the object. 3. When using an oven to wrinkle finish a machine, have the oven preheated to: A. 230 degrees. B. 175 degrees. C. 250 degrees. 4. The length of time that a piece of metal should be heated in order for the

COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE OBJECTIVE NO. 3.0 (cont'd) Basic Information

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		3.2	finish to wrinkle depends upon: A. The thickness of the metal. B. The amount of paint that is applied. C. The temperature of the oven.
3.3	Upon completion of unit of instruction covering refinishing scales, the student will attain 75% proficiency on a teacher made test.	3.3	Mark True or False 1. Do not touch the numbers with your fingers until they have dried at least 24 hours. 2. If the scale needs repainting, first remove about 1/2 of the old paint. 3. You can brighten the numbers on a scale with: A. Lacquer paint. B. Lacquer stick. C. Sand paper. 4. You should paint the scales with: A. Enamel paint. B. Oil paint. C. Lacquer paint.

COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE OBJECTIVE NO. 4.0 Pitch Information

Upon completion of the unit of instruction covering the pitch of a typewriter, ribbons, ribbon spools, platchs and feed rools, the student will achieve 75% proficiency on each I.P.O. criterion measure.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
4.1	Upon completion of the unit of instruction covering ribbons and ribbon spools, the student will achieve 75% proficiency on a teacher made test.	4.1	1. The standard length of the cotton ribbon is: A. 18 yards. B. 12 yards. C. 10 yards. 2. Most of the ribbons on current model machines are reversed by a tripping mechanism activated by: A. A full spool. B. An eyelet in the ribbon. C. A empty spool. 3. When installing a two-color ribbon (black and red) always: A. Put the red portion at the top. B. Put the black portion at the top. C. Either way is alright. 4. A good check to determine the condition of a ribbon, good or bad, is to: A. Pull it through your fingers. B. Type on it. C. Simply look at the ribbon.
4.2	Upon completion of the unit of instruction dealing with platens and feed rolls, the student will achieve at least 75% proficiency on a teacher made test.	4.2	1. What chemical restores new life to a platen? 2. Two important qualities of a platen are: A. Softness and color. B. Hardness and resilience. C. Length and hardness.

COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE OBJECTIVE NO. 4.0 (cont'd) Pitch Information

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		4.2	3. There are various grades of plates. Code "M" is used for: A. 4 to 8 copies. B. 8 to 12 copies. C. 1 to 6 copies. 4. When sending in platen for recovering, always: A. Leave the platen knobs on. B. Remove the platen knobs. C. Remove the left platen knob only.
4.3	Upon completion of the unit of instruction concerned with the pitch of a typewriter, the student will achieve 75% proficiency on a teacher made test.	4.3	1. The pitch of a typewriter refers to: A. The number of teeth on the starwheel. B. The number of spaces per inch. C. The length of the carriage. 2. The most common pitches of typewriters are: A. 10-12. B. 10-14. C. 12-14. 3. The pica refers to the: A. 10 pitch. B. 12 pitch. C. 14 pitch. 4. Unless it is stamped in such a way as to indicate another pitch, a part is normally a: A. 10 pitch. B. 12 pitch. C. 14 pitch.

COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE OBJECTIVE NO. 5.0 Type Bar Soldering Information

Upon completion of unit of instruction concerned with binds, type bars and links, type alinging and type soldering, the student will achieve 75% proficiency on each I.P.O. criterion measure.

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
5.1	Upon completion of a unit of instruction covering binds, the student will achieve 75% proficiency on a teacher made test.	5.1	1. The preferred way to eliminate a bind is to: A. Oil it. B. Bend it. C. Replace it with a new part. 2. List three things that can cause a bind in a typewriter. 1. _____ 2. _____ 3. _____ 3. Binds cause about ___% of the trouble typewriter mechanics have when working on a machine. 4. True or False Proper spring tension can be helpful in dealing with a bind.
5.2	Upon completion of unit of instruction covering type bars and links, the student will achieve 75% proficiency on a teacher made test.	5.2	True or False 1. The Underwood links are interchangeable. 2. If a link breaks, a temporary emergency measure is to use a paper clip (small piece) as a link. 3. On the later model typewriters, the number of type bars is: A. 34. B. 44. C. 54.

COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE OBJECTIVE NO. 5.0 (cont'd) Type Bar Soldering Information

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		5.2	4. The center point of all the type bars is between the: A. Y and H keys. B. H and A keys. C. Y and K keys.
5.3	Upon completion of unit of instruction dealing with type soldering, the student will achieve 100% proficiency on a teacher made test.	5.3	Name and explain below the two types of soldering gauges: A. Universal _____ _____ B. Ideal _____ _____
5.4	Upon completion of unit of instruction concerned with type alignment, the student will achieve 75% proficiency on a teacher made test.		

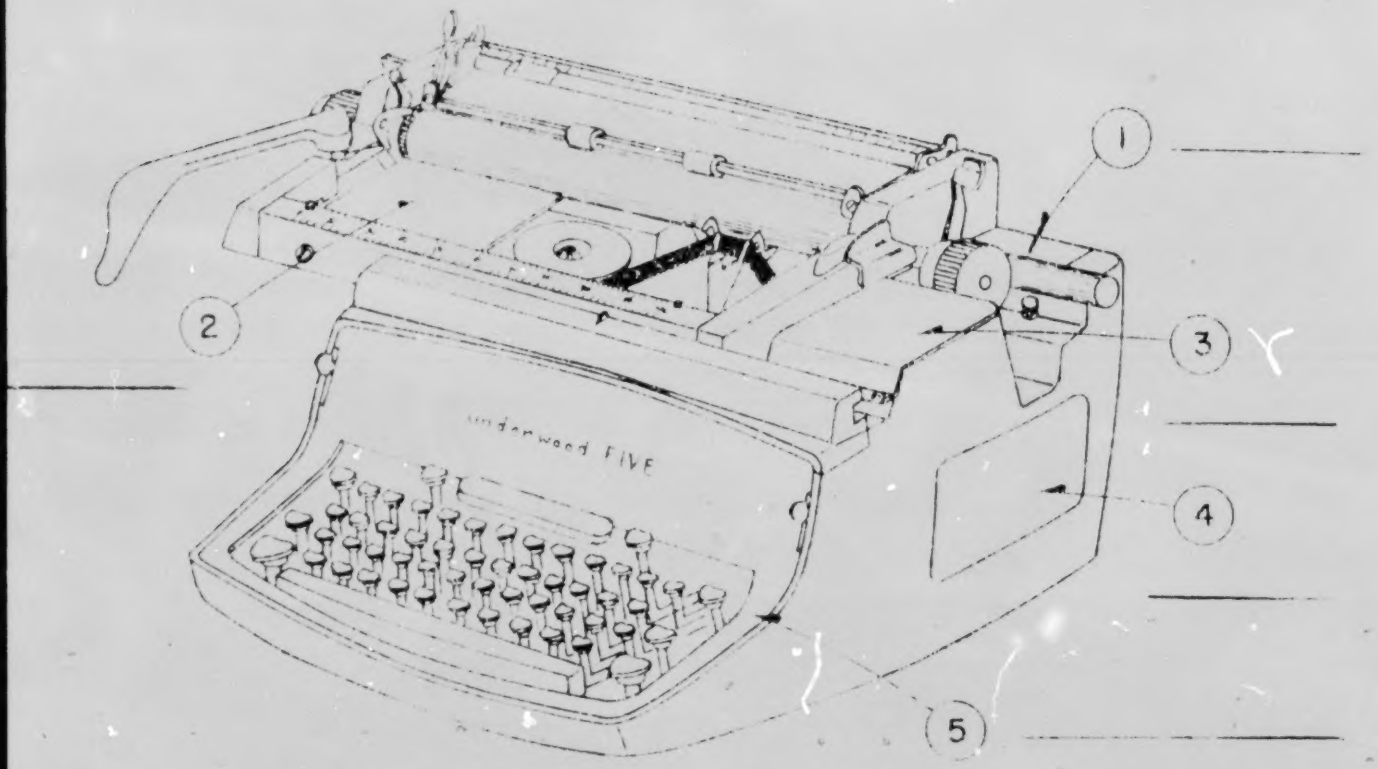
COURSE BUSINESS MACHINE MAINTENANCE-BASIC

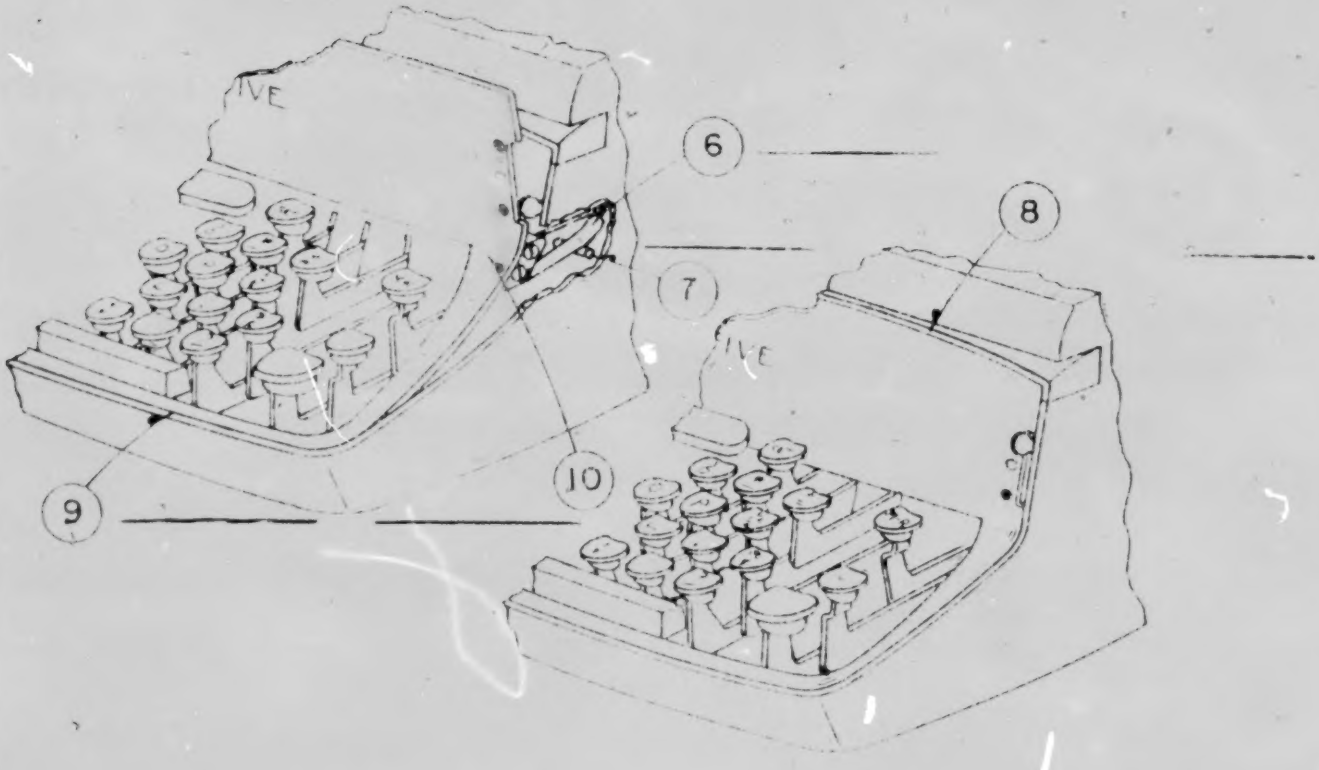
TERMINAL PERFORMANCE OBJECTIVE NO. 6.0 Typewriter Carriage

The student will disassemble, identify and reassemble the carriage assembly with 75% accuracy as judged by rating scale.

Selecting tools	40%
Accuracy	40%
Speed	10%
Neatness	10%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		6.0	Disassemble, identify parts and reassemble carriage assembly on Underwood V typewriter.
6.1	Given a pictorial chart of the cover assembly, the student will correctly identify 8 of the 10 parts.	6.1	Identify the 10 parts of the cover assembly on the attached chart.
6.2	Given an Underwood V, standard typewriter, the student will remove and reinstall the carriage with 80% accuracy.	6.2	Remove and reinstall the carfiage on an Underwood V, standard typewriter. You will be graded on the following scale: Selection of tools 40% Accuracy 40% Speed 10% Neatness 10%


1
2
3
4
5
underwood FIVE


6
7
8
9
10
FIVE
FIVE

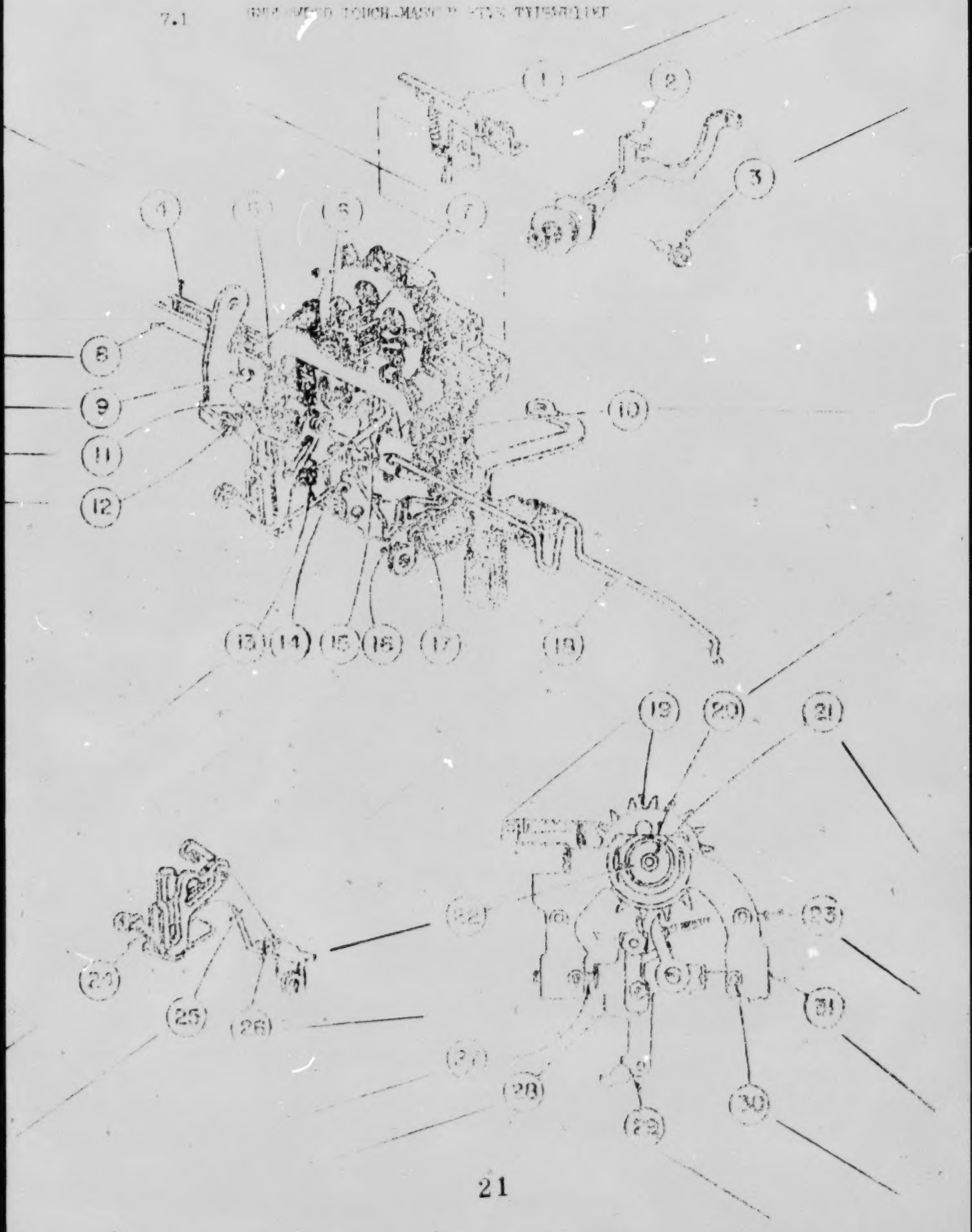
COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE
OBJECTIVE NO. 7.0 Escapement

The student will disassemble, identify and reassemble the escapement assembly with 80% accuracy as judged by rating scale.

Selecting tools	40%
Accuracy	40%
Speed	10%
Neatness	10%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		7.0	Disassemble, identify parts and reassemble escapement assembly on an Underwood V typewriter.
7.1	Given a pictorial graph of the escapement assembly, the student will correctly identify 22 of 30 parts.	7.1	Identify the 30 parts of the escapement assembly on the attached chart.
7.2	Given an escapement assembly from an Underwood V, standard typewriter, the student will remove and reinstall the parts with 80% accuracy.	7.2	Disassemble and reassemble the escapement assembly assigned you. You will be graded on the following scale: Selection of tools 40% Accuracy 40% Speed 10% Neatness 10%


1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31

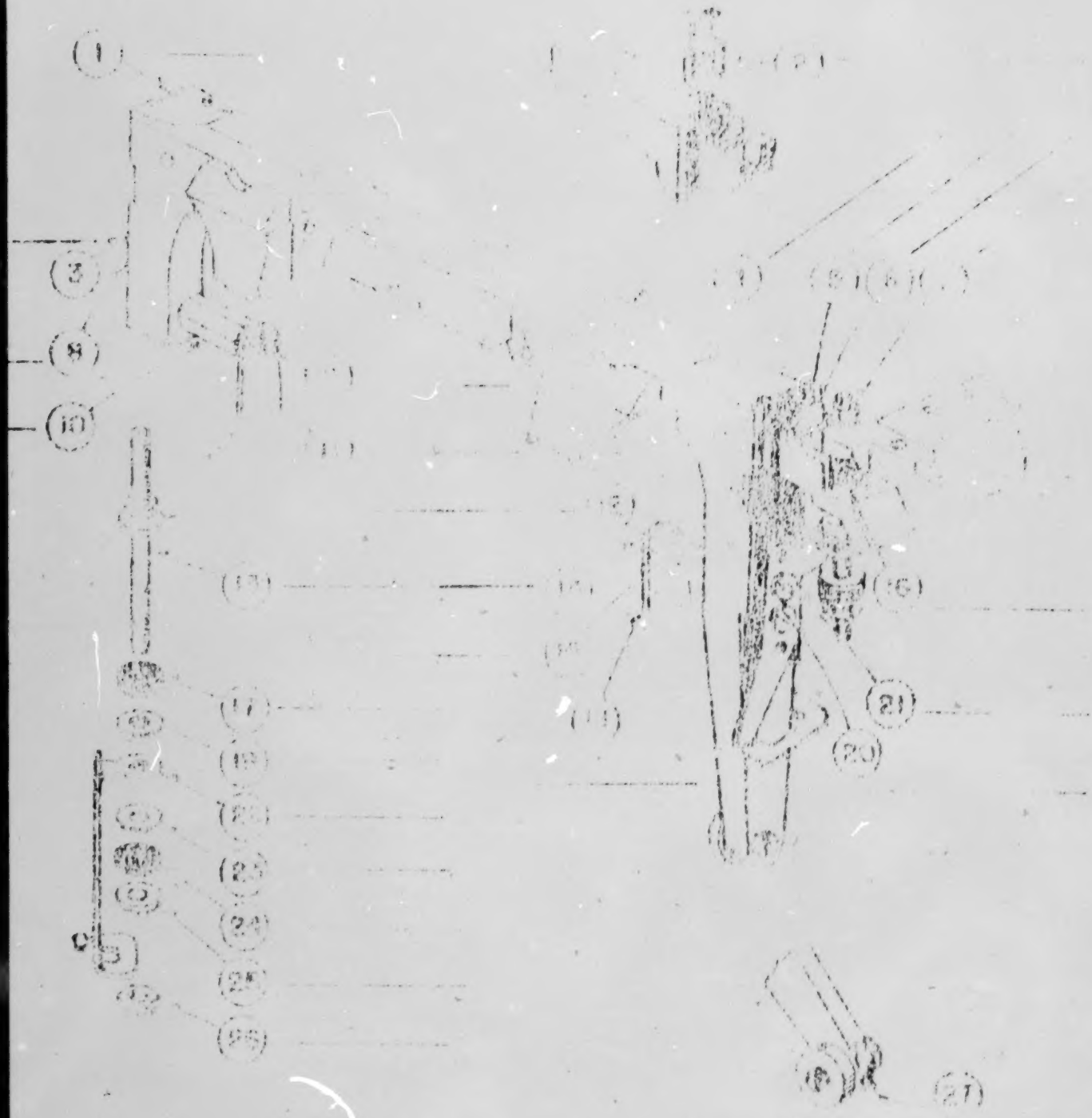
COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE OBJECTIVE NO. 8.0 Segment Assembly

The student will disassemble, identify and reassemble the segment assembly with 80% accuracy as judged by rating scale.

Selecting tools	40%
Accuracy	40%
Speed	10%
Neatness	10%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		8.0	Disassemble the segment assembly assigned you. Identify each part by name to the instructor. Reassemble the assembly. You will be graded as follows: Selection of tools 40% Accuracy 40% Speed 10% Neatness 10%
8.1	Given a pictorial chart of the segment assembly, the student will correctly identify 20 of 27 parts.	8.1	Identify the 27 parts of the segment assembly on the attached chart.



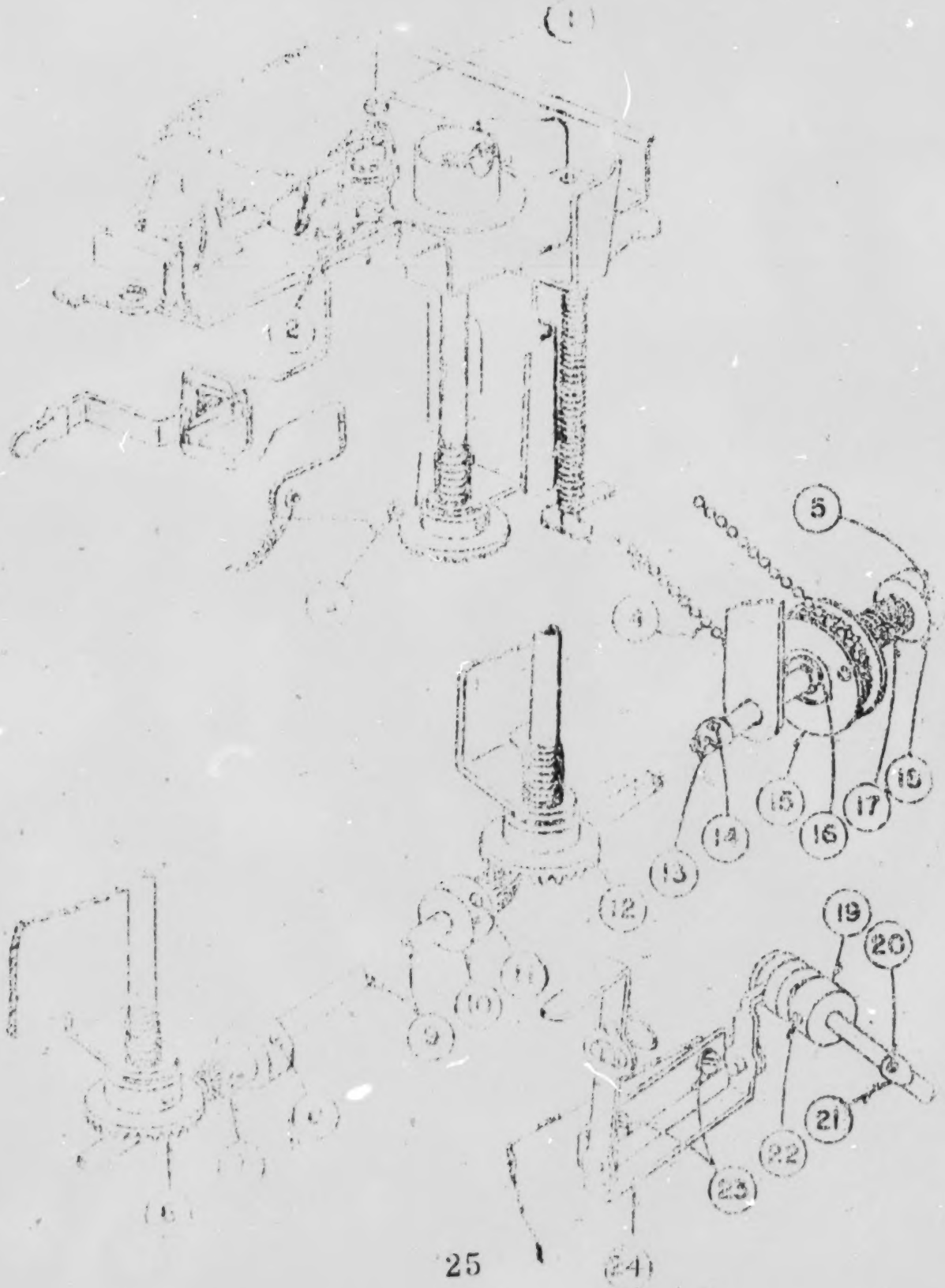
COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE OBJECTIVE NO. 9.0 Ribbon Mechanism

The student will disassemble, identify and reassemble the ribbon bichrome mechanism with 80% accuracy as judged by rating scale.

Selecting tools	40%
Accuracy	40%
Speed	10%
Neatness	10%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		9.0	Disassemble, identify parts and reassemble ribbon bichrome mechanism on an Underwood V typewriter.
9.1	Given a pictorial chart of the ribbon bichrome mechanism, the student will correctly identify 8 of 10 parts.	9.1	Identify the 10 parts of the ribbon bichrome mechanism on the attached drawing.
9.2	Given an Underwood V, standard typewriter, the student will remove and reinstall the ribbon bichrome mechanism with 80% accuracy.	9.2	Remove and reinstall the ribbon bichrome mechanism on an Underwood V. You will be graded as follows: Selection of tools 40% Accuracy 40% Speed 10% Neatness 10%


1
2
5
4
14
13
15
17
16
18
12
19
20
21
22
23
24

COURSE BUSINESS MACHINE MAINTENANCE-BASIC

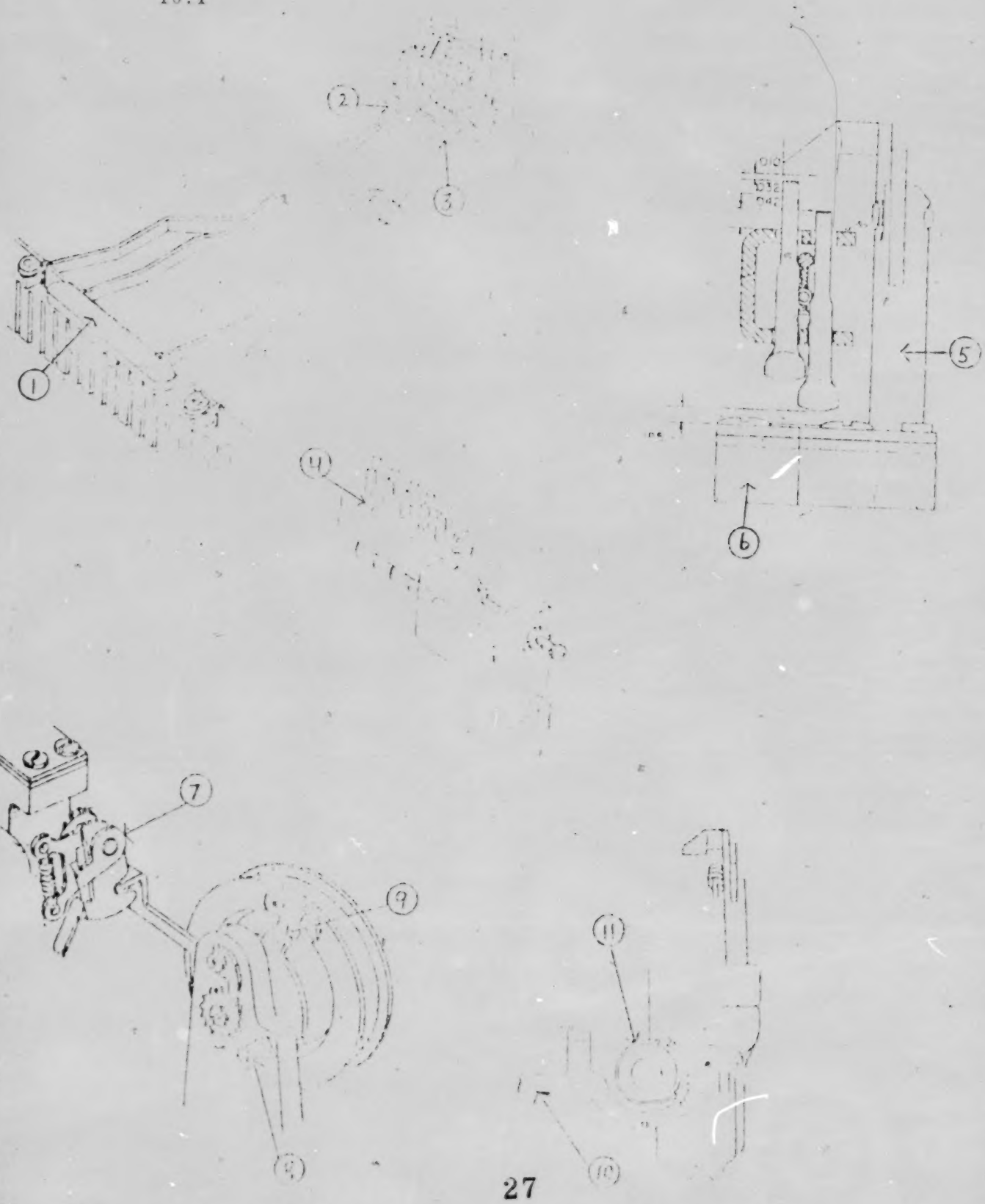
TERMINAL PERFORMANCE OBJECTIVE NO. 10.0 Tabulation Unit-Underwood Typewriter

Upon completion of the tabulation unit of instruction, the student will answer 75% of the attached I.P.O. criterion tests correctly. In addition, the student will disassemble, identify and reassemble the tabulation mechanism with 80% accuracy as judged by rating scale.

Selecting tools	40%	Speed	10%
Accuracy	40%	Neatness	10%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
10.1	Given a pictorial chart of the tabulation mechanism, the student will correctly identify 8 of 11 parts.	10.1	Identify the 11 parts of the tabulation mechanism on the diagram.
10.2	Given an Underwood V, standard typewriter, the student will remove and reinstall the tabulation mechanism with 80% accuracy.	10.2	Remove and reinstall the tabulation mechanism on an Underwood V. You will be graded as follows: Selection of tools 40% Accuracy 40% Speed 10% Neatness 10%

10.1



COURSE BUSINESS MACHINE MAINTENANCE (Basic)

TERMINAL PERFORMANCE OBJECTIVE NO. 10.0 Underwood Typewriter

Please place correct letter in the space provided to the left of the question. Choose the one that most closely answers the question.

(Test Questions)

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		10.0	___ 1. How much clearance should there be between the carriage frame and the wayrod? A. 003 B. 025 C. 010
			___ 2. How should the two front rollers of the carriage be adjusted? A. The left roller should roll on the top of the rail. B. The right roller should roll on the top of the rail. C. The left roller should roll in the center of the rail.
			___ 3. The (A. Left-B. Right-C. Both) rollers on the front carriage are eccentris and can be adjusted.
			___ 4. The rack should be adjusted. A. Deeply as possible without actual bottoming. B. High enough to enable it to be raised.

COURSE BUSINESS MACHINE MAINTENANCE (Basic)

TERMINAL PERFORMANCE OBJECTIVE NO. 10.0 (cont'd) Underwood Typewriter

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
			___ C. Fully in mesh with the pinoin. ___ 5. The adjustment for proper line spacing is: A. Adjusting the detent roller forward or rearward. B. Adjusting the line space lever. C. Adjusting the line space pawl up or down. ___ 6. To increase the draw-band tension: A. Disconnect the draw-band and wind the spring drum. B. Loosen the pawl on the ratchet and turn the spring drum screw counter clock wise. C. Loosen the pawl on the ratchet and turn the spring drum screw clockwise. ___ 7. To adjust the end play in a platen: A. Loosen the left platen knob and adjust the screw in the end of the knob in or out. B. Loosen the right platen knob and adjust the screw in the end of the knob in or out. C. Tighten both platen knobs.

COURSE BUSINESS MACHINE MAINTENANCE (Basic)

TERMINAL PERFORMANCE OBJECTIVE NO. 10.0 (cont'd) Underwood Typewriter

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
			___ 8. Adjust the end play of the feed rollers on the shafts: A. By opening or closing the slots in the shaft spacers. B. By forming the shaft brackets. C. By adjusting the shaft adjusting screws. ___ 9. The feed roller must have a good grip on: A. 17 sheets of paper B. 5 sheets of paper. C. 1 sheet of paper. ___10. The type bars should contact the universal bar: A. When the typehead is 7-1/8 inches from the type bar guide. B. When the typehead enters the type bar guide. C. When the typehead is 3/8 inches from the type bar guide. ___11. In the space provided below, explain the procedure for adjusting the universal bar. _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____

COURSE BUSINESS MACHINE MAINTENANCE (Basic)

TERMINAL PERFORMANCE OBJECTIVE NO. 10.0 (cont'd) Underwood Typewriter

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
			___12. The clearance between the wayrod and the starwheel should be: A. About .003. B. 1/2 inch. C. 3/8 inch. ___13. The left to right distance between the loose dog and the rigid dog must be: A. Between .030 to .036. B. Between .010 to .015. C. Between .020 to .025. ___14. To position the rocker at a six o'clock position: A. Adjust the starwheel to the left or right. B. Adjust the loose dog to the left or right. C. Adjust the rocker to the left or right. ___15. The loose dog must be positioned: A. Flush with the starwheel tooth. B. .010 behind the front edge of the starwheel tooth. C. .010 in front of the starwheel tooth. ___16. The escapement trip should occur when: A. The type bar enters the type guide. B. The type bar is 1/64 inch past the type guide. C. The type bar is 1/64 inch in front of the type guide.

COURSE BUSINESS MACHINE MAINTENANCE (Basic)

TERMINAL PERFORMANCE OBJECTIVE NO. 10.0 (cont'd) Underwood Typewriter

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		10.0	___17. The back limit adjustment should be made: A. After the master trip adjustment is made. B. Before the master trip adjustment is made. C. Before the front limit adjustment is made. ___18. The correct position of the space bar is: A. Even with the front frame. B. One inch above the front frame. C. 3/8 inch below the bottom row of keys. ___19. The distance between the space bar trip lever and the rocker should be: A. Between .003 and .006. B. About .010 to .030. C. Exactly 3/8 inch. ___20. To remove the end play in the segment: A. Tighten the outer rail binding nuts. B. Tighten the lock nut on the segment shaft. C. Move the bracket wedge down.

COURSE BUSINESS MACHINE MAINTENANCE (Basic)

TERMINAL PERFORMANCE OBJECTIVE NO. 10.0

Underwood Typewriter

(Test Questions)

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		10.0	___ 1. Explain how the segment is properly adjusted in the space provided below. _____ _____ _____ _____ _____ _____ _____ _____ _____ _____ _____
			___ 2. The "on feet" adjustment is made by using: A. The small letters. B. The large letters. C. Either the small or the large letters.
			___ 3. The "on feet" adjustment is made by: A. Adjusting the segment up or down as needed. B. Adjusting the carriage up or down as needed. C. Adjusting the platen up or down as needed.
			___ 4. The ring and cylinder adjustment is made by: A. Adjusting the carriage forward or rearward.

COURSE BUSINESS MACHINE MAINTENANCE (Basic)

TERMINAL PERFORMANCE OBJECTIVE NO. 10.0 (cont'd) Underwood Typewriter

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		10.0	B. Adjusting the platen forward or rearward. C. Tilting the segment forward or rearward. ___ 5. The proper adjustment for the ring and cylinder is checked by: A. A slight drag on two sheets of paper. B. A slight drag on five sheets of paper. C. Drag on one sheet of paper. ___ 6. The "motion" must be made by: A. Before the ring and cylinder adjustment is made. B. After the ring and cylinder adjustment is made. C. Before the "on feet" adjustment is made. ___ 7. The "motion" adjustment is made by: A. Aligning the small letters with the large letters. B. Aligning the large letters with the small letters. C. Aligning either large letters or small letters with each other. ___ 8. When the ribbon is in the rest position: A. The top of the ribbon should be .015 to .025 above the type bar guide.

COURSE BUSINESS MACHINE MAINTENANCE (Basic)

TERMINAL PERFORMANCE OBJECTIVE NO. 10.0 (cont'd) Underwood Typewriter

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
			B. The top of the ribbon should be below the type bar guide. C. The ribbon should move slightly when the bichrome lever is moved.
			___ 9. The bichrome universal bar should be resting on the: A. "H" key lever. B. Vibrator arm. C. "Period" key lever.
			___10. To obtain the proper throw of the ribbon: A. Adjust the screw on the back of the bichrome universal bar. B. Form the bracket on the back of the bichrome universal bar. C. Raise or lower the rest position.
			___11. The black and red Up Stop adjustments are checked by: A. Typing hard on the one-half key. B. Holding the type bar to the platen. C. Pulling up on the vibrator.
			___12. The ribbon feed is driven by: A. The main spring. B. The gear on the starwheel shaft. C. The ribbon drive pawl.

COURSE BUSINESS MACHINE MAINTENANCE (Basic)

TERMINAL PERFORMANCE OBJECTIVE NO. 10.0 (cont'd) Underwood Typewriter

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
			___13. The reverse cams on the ribbon drive shaft should be positioned: A. One high side up and the other high side down. B. Both high sides up. C. Both high sides down.
			___14. The clearance between the high point of the reverse cams and the plungers should be: A. 1/2 inch. B. .003. C. 1/16 inch.
			___15. To adjust the tabulator rack in proper timing with the escapement, move the rack: A. Either left or right as needed. B. Up or down as needed. C. Forward or rearward as needed.
			___16. To adjust the tabulator rack so that the set pins may be fully set and unset, move the rack: A. Either left or right as needed. B. Up or down as needed. C. Forward or rearward as needed.
			___17. With the carriage in the banked or returned position, there should be: A. 1/2 inch between the

COURSE: BUSINESS MACHINE MAINTENANCE (Basic)

TERMINAL PERFORMANCE OBJECTIVE NO. 10.0 (cont'd) Underwood Typewriter

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
			left margin stop and the margin stop slide. B. No clearance between the left margin stop and the margin stop slide. C. .003 clearance between the left margin stop and the margin stop slide.
			___18. With the carriage pushed completely to the right, the lock slide should: A. Engage as deeply as possible into the pinion. B. Engage one-third into the pinion. C. Clear the pinion by about .003.
			___19. The bell should ring: A. One space after the line lock engages. B. Seven or eight spaces before the line lock engages. C. Three or four spaces before the line lock engages.
			___20. When the back space key is restored to normal, the back space pawl should: A. Engage one-third with the pinion. B. Engage fully with the pinion. C. Not contact the pinion.

COURSE BUSINESS MACHINE MAINTENANCE-BASIC

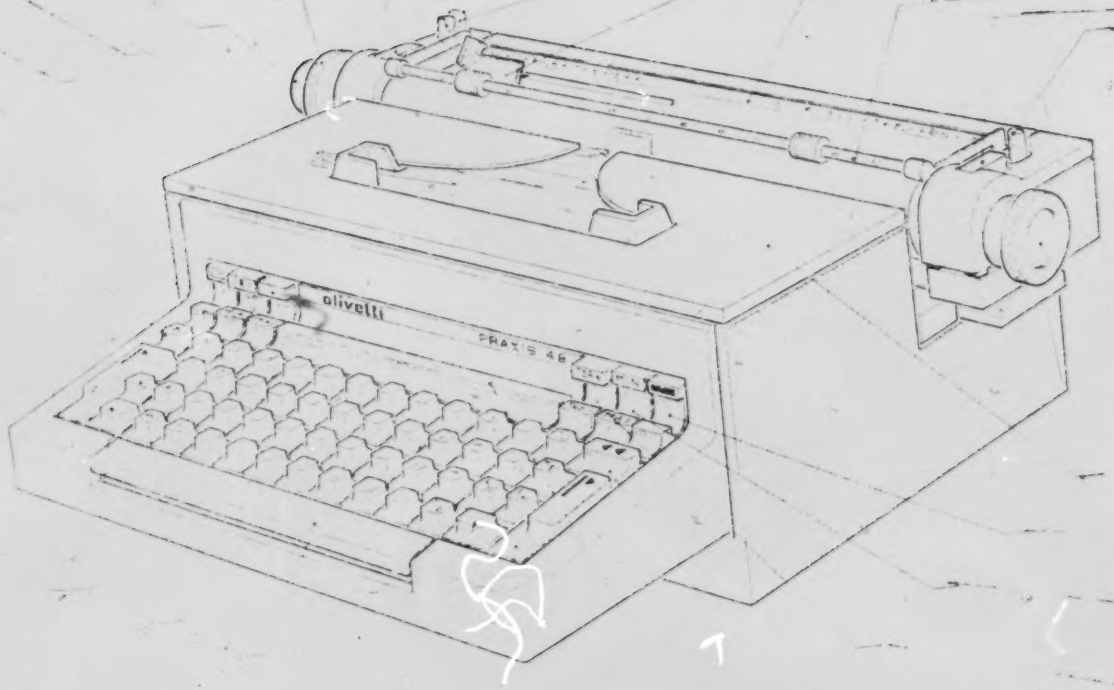
TERMINAL PERFORMANCE
OBJECTIVE NO. 11.0 Use and Features

The student will disassemble, identify and reassemble the case on an Olivetti electric typewriter with 75% accuracy as judged by rating scale.

Selecting tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		11.0	Disassemble, identify parts and reassemble the case on an Olivetti electric typewriter.
11.1	Given a pictorial chart of the features assembly, the student will correctly identify 18 of 23 parts.	11.1	Identify the 23 parts on the attached chart.
11.2	Given an Olivetti electric typewriter, the student will remove and reinstall the case covers with 75% accuracy.	11.2	Remove and reinstall the case covers on an Olivetti electric typewriter. You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%

11.1



COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE OBJECTIVE NO. 12.0 Power Transmission

The student will disassemble, identify and reassemble the power transmission assembly of an Olivetti electric typewriter with 75% accuracy as judged by rating scale.

Selecting tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		12.0	Disassemble, identify parts and reassemble the power transmission assembly on an Olivetti electric typewriter.
12.1	Given a pictorial chart of the power transmission assembly, the student will correctly identify 7 of 9 parts.	12.1	Identify the 9 parts on the attached chart.
12.2	Given an Olivetti electric typewriter, the student will remove and reinstall the power transmission with 75% accuracy.	12.2	Remove and reinstall the power transmission on an Olivetti electric typewriter. You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%

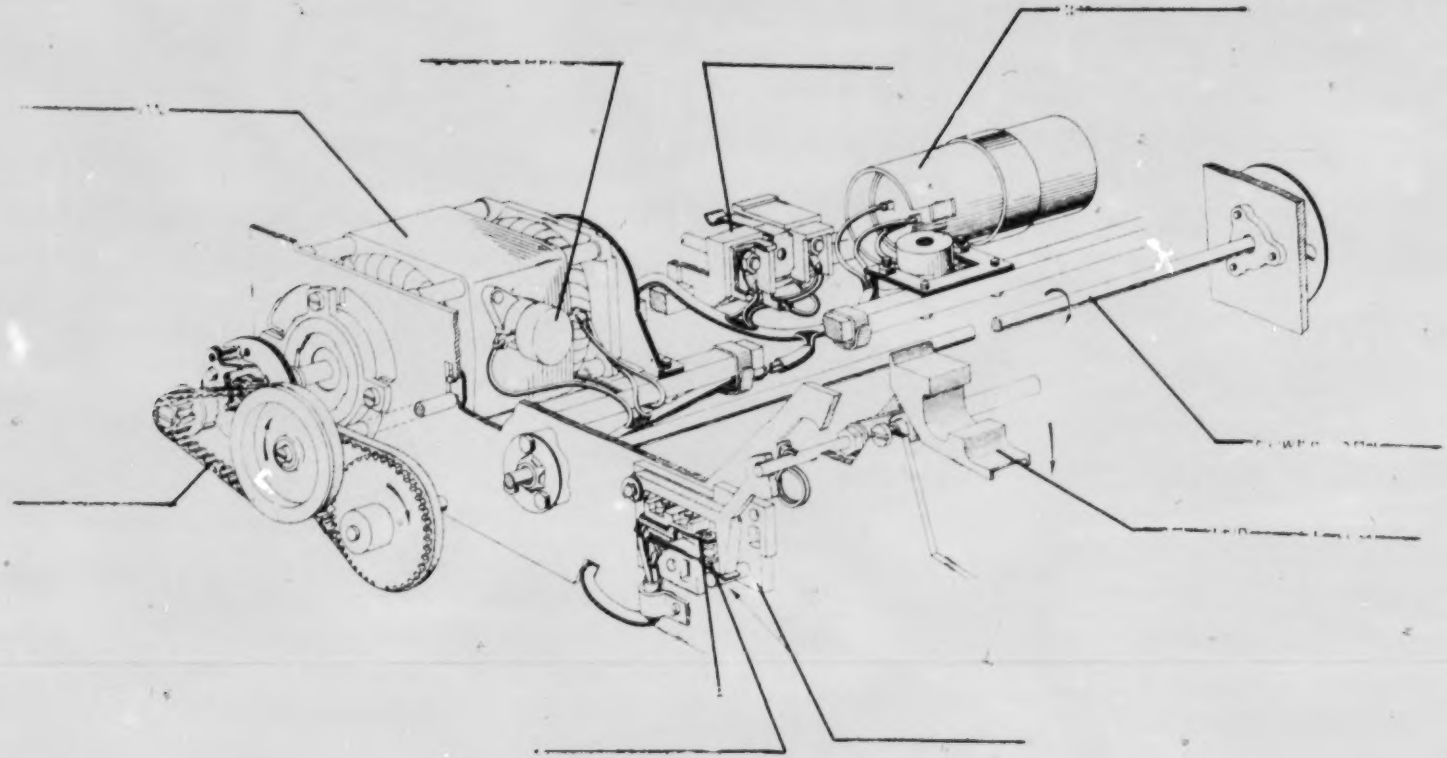


FIGURE 1

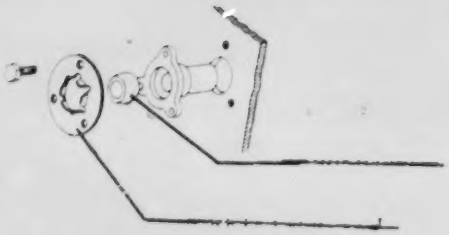


FIGURE 2

12.1

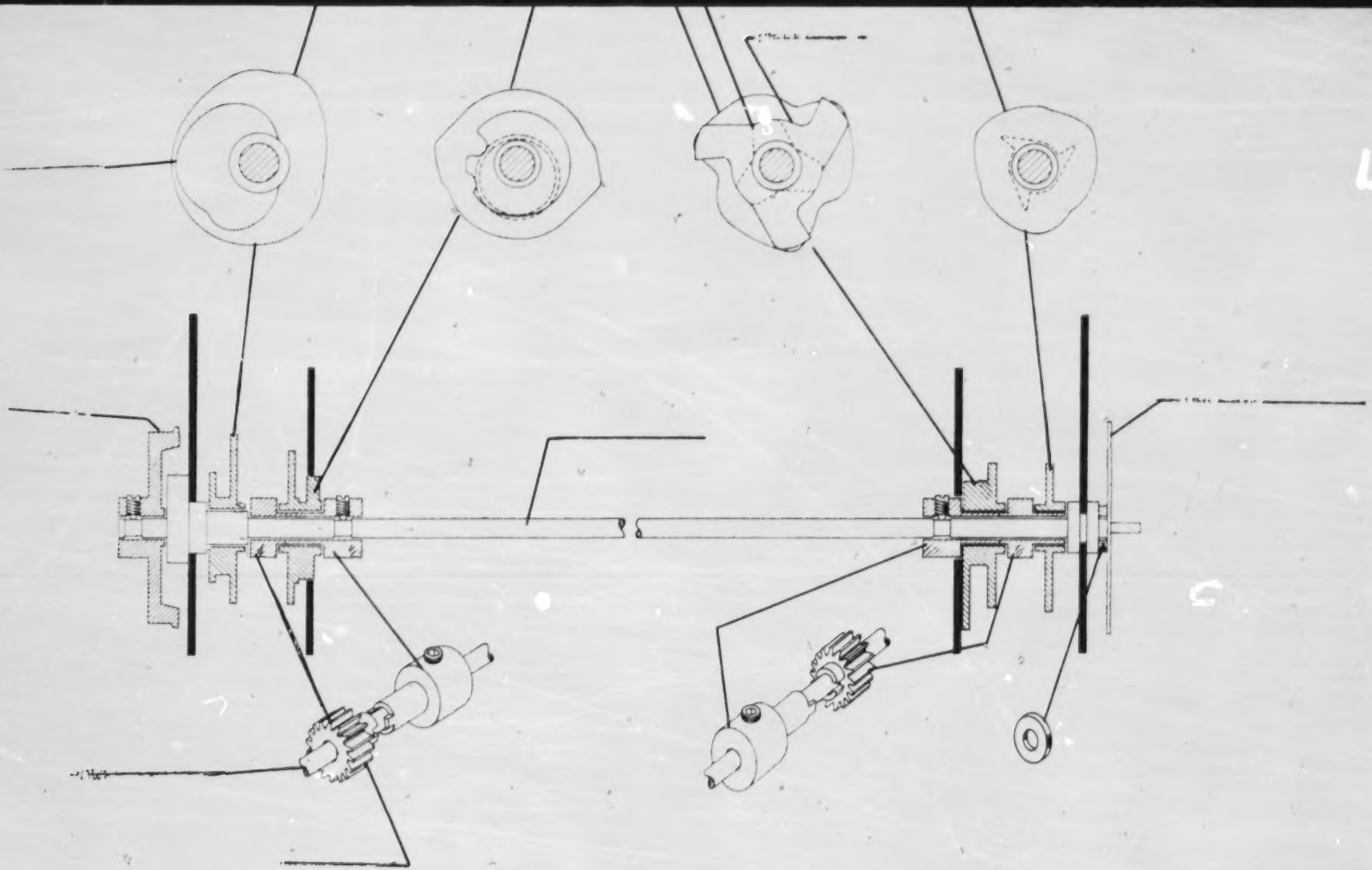
COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE
OBJECTIVE NO. 13.0 Power Shaft & Cams

The student will disassemble, identify and reassemble the power shaft and cams of an Olivetti electric typewriter with 75% accuracy as judged by rating scale.

Selecting tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		13.0	Disassemble, identify parts and reassemble the power shaft and cams on an Olivetti electric typewriter.
13.1	Given a pictorial chart of the power shaft and cams assembly, the student will correctly identify 9 of 12 parts.	13.1	Identify the 12 parts shown on the attached sheet.
13.2	Given an Olivetti electric typewriter, the student will remove and reinstall the power shaft and cams with 75% accuracy.	13.2	Remove and reinstall the power shaft and cams on an Olivetti electric typewriter. You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%



13.1

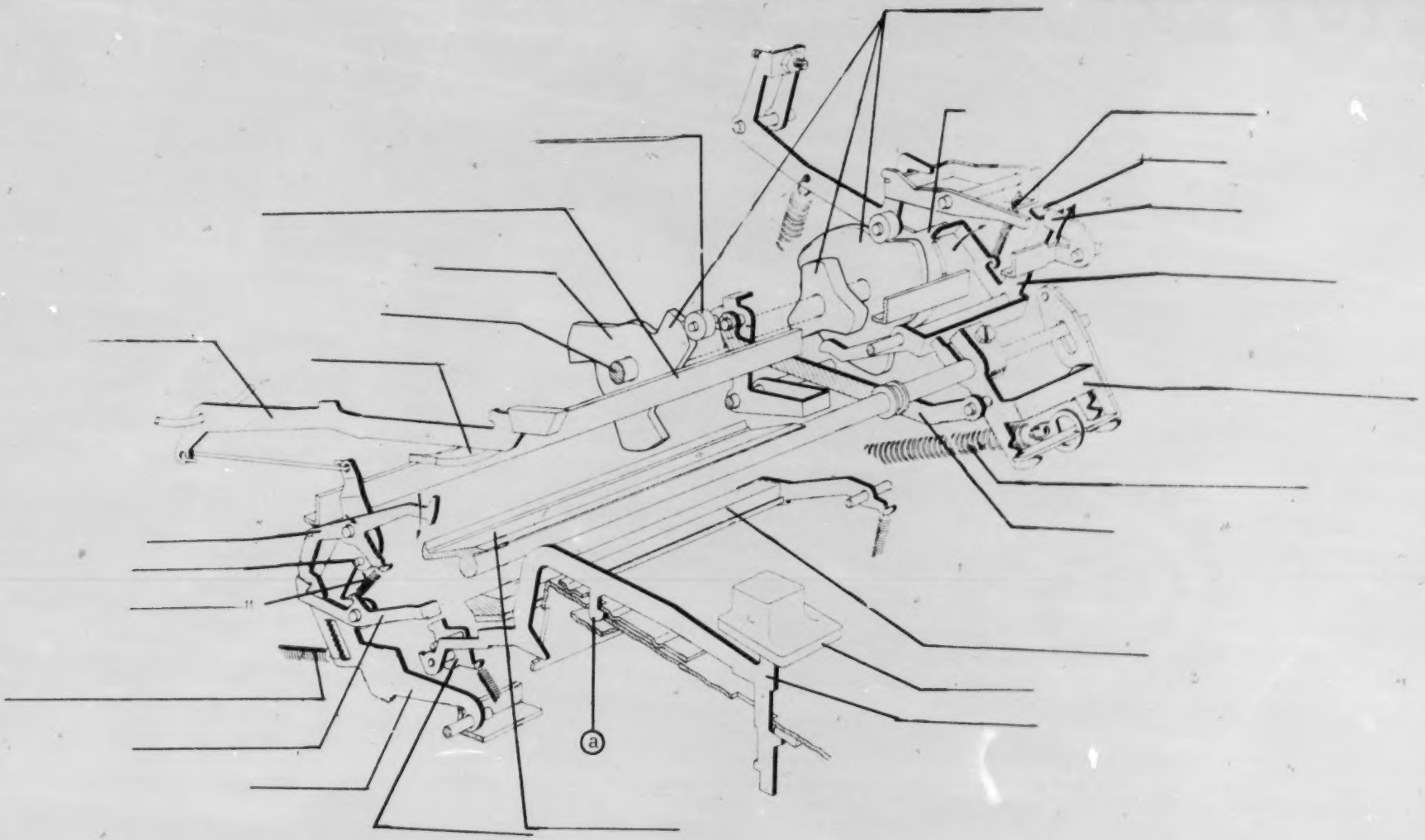
COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE OBJECTIVE NO. 14.0 Type Action Mechanism

The student will disassemble, identify and reassemble the type action mechanism of an Olivetti electric typewriter with 75% accuracy as judged by rating scale.

Selecting tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		14.0	Disassemble, identify parts and reassemble the type action mechanism on an Olivetti electric typewriter.
14.1	Given a pictorial chart of the type action mechanism assembly, the student will correctly identify 16 of 26 parts.	14.1	Identify the 26 parts on the attached sheet.
14.2	Given an Olivetti electric typewriter, the student will remove and reinstall the type action mechanism with 75% accuracy.	14.2	Remove and reinstall the type action mechanism on an Olivetti electric typewriter. You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%



14.1

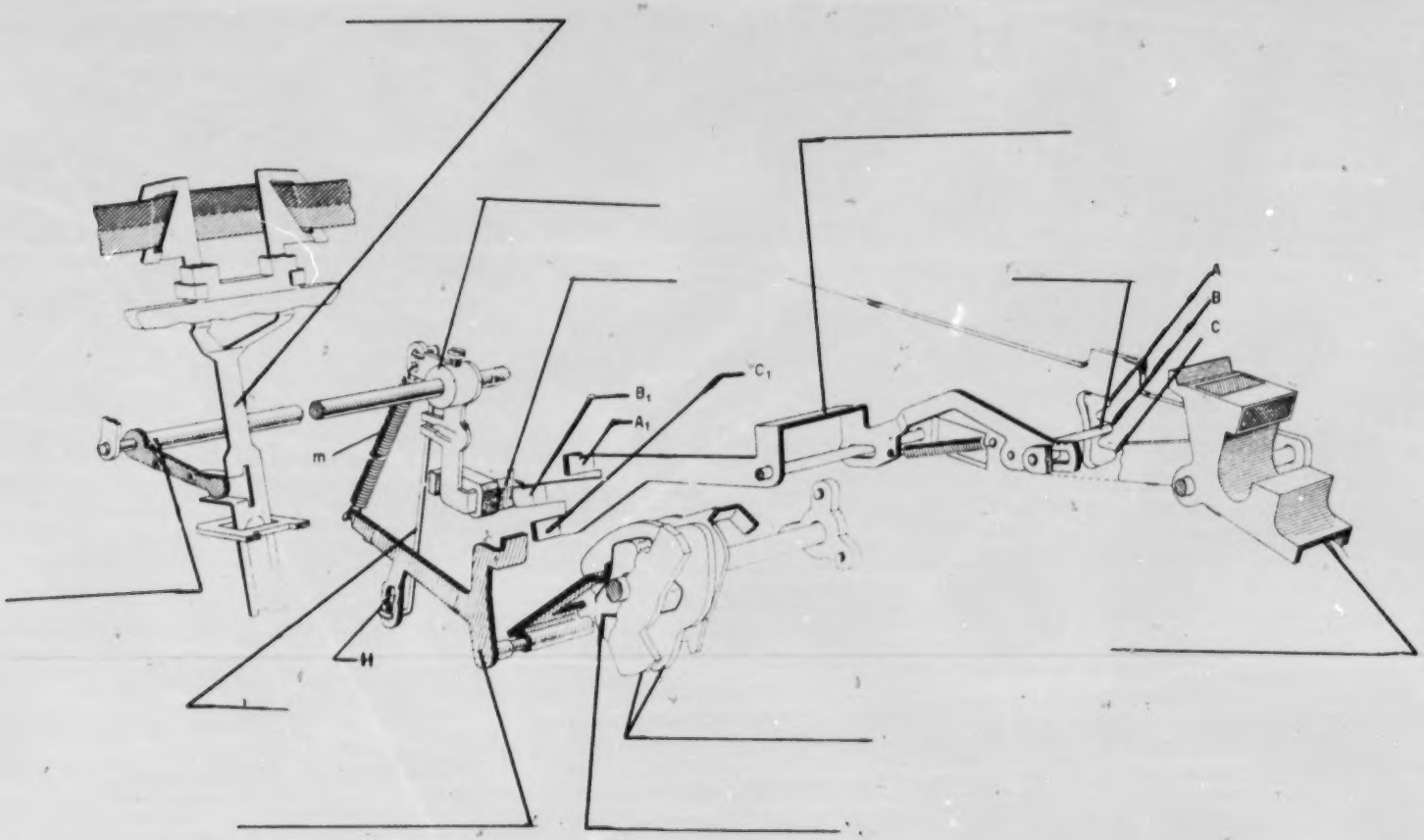
COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE OBJECTIVE NO. 15.0 Ribbon Lift & Feed Mechanism

The student will disassemble, identify and reassemble the ribbon lift and feed mechanism of an Olivetti electric typewriter with 75% accuracy as judged by rating scale.

Selecting tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		15.0	Disassemble, identify parts and reassemble the ribbon lift and feed mechanism on an Olivetti electric typewriter.
15.1	Given a pictorial chart of the ribbon lift assembly, the student will correctly identify 9 of 11 parts.	15.1	Identify 11 parts on the attached chart.
15.2	Given an Olivetti electric typewriter, the student will remove and reinstall the ribbon lift and feed mechanism with 75% accuracy.	15.2	Remove and reinstall the ribbon lift and feed mechanism on an Olivetti electric typewriter. You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%



15.1

COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE
OBJECTIVE NO. 16.0 Segment Shift Mechanism

The student will disassemble, identify and reassemble the segment shift mechanism of an Olivetti electric typewriter with 75% accuracy as judged by rating scale.

Selecting tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		16.0	Disassemble, identify parts and reassemble the segment shift mechanism on an Olivetti electric typewriter.
16.1	Given a pictorial chart of the segment shift assembly, the student will correctly identify 12 of 15 parts.	16.1	Identify 15 parts on the attached chart.
16.2	Given an Olivetti electric typewriter, the student will remove and reinstall the segment shift shaft with 75% accuracy.	16.2	Remove and reinstall the segment shift shaft on an Olivetti electric typewriter. You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%

FIGURE 2

FIGURE 3

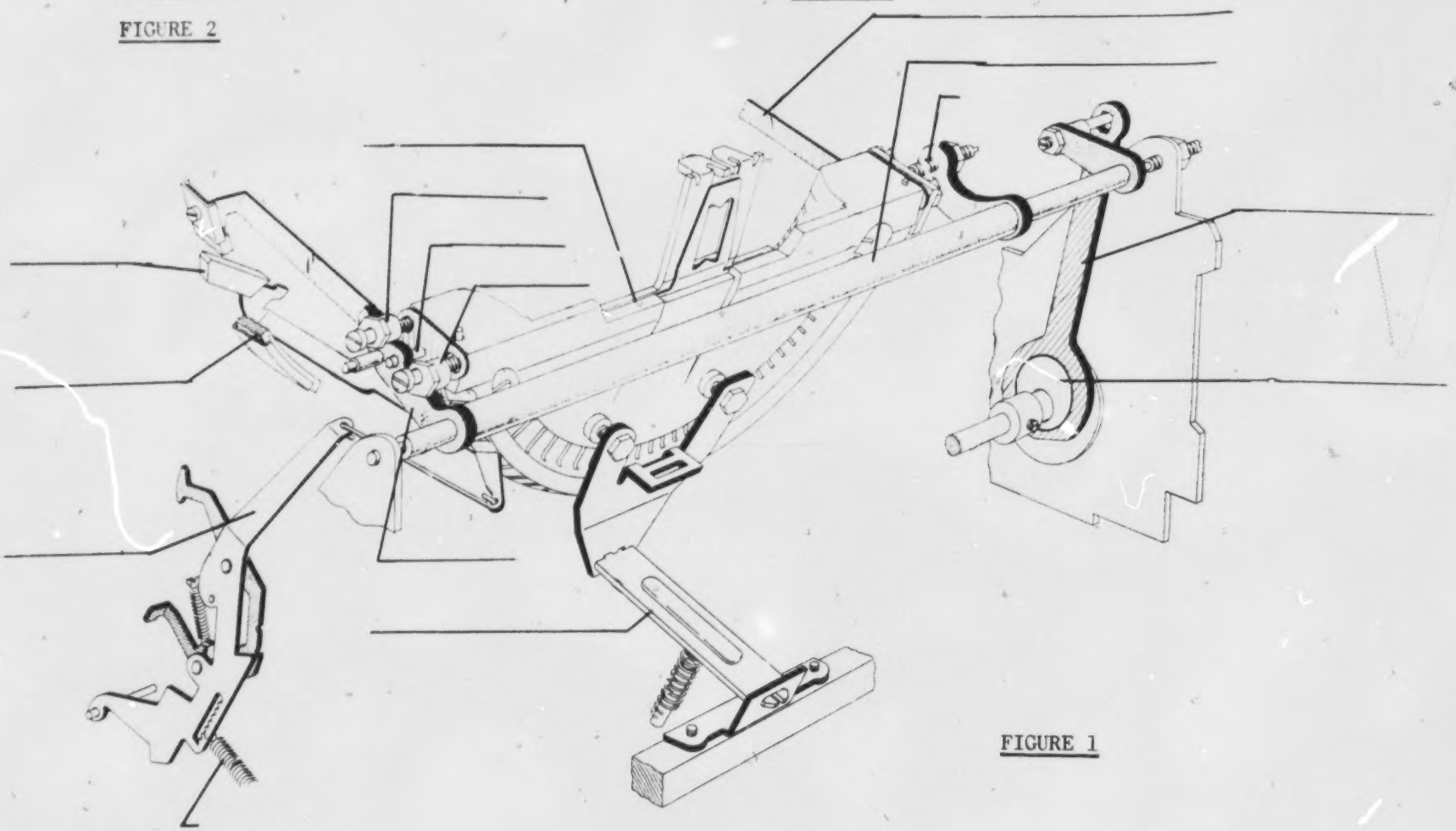


FIGURE 1

16.1

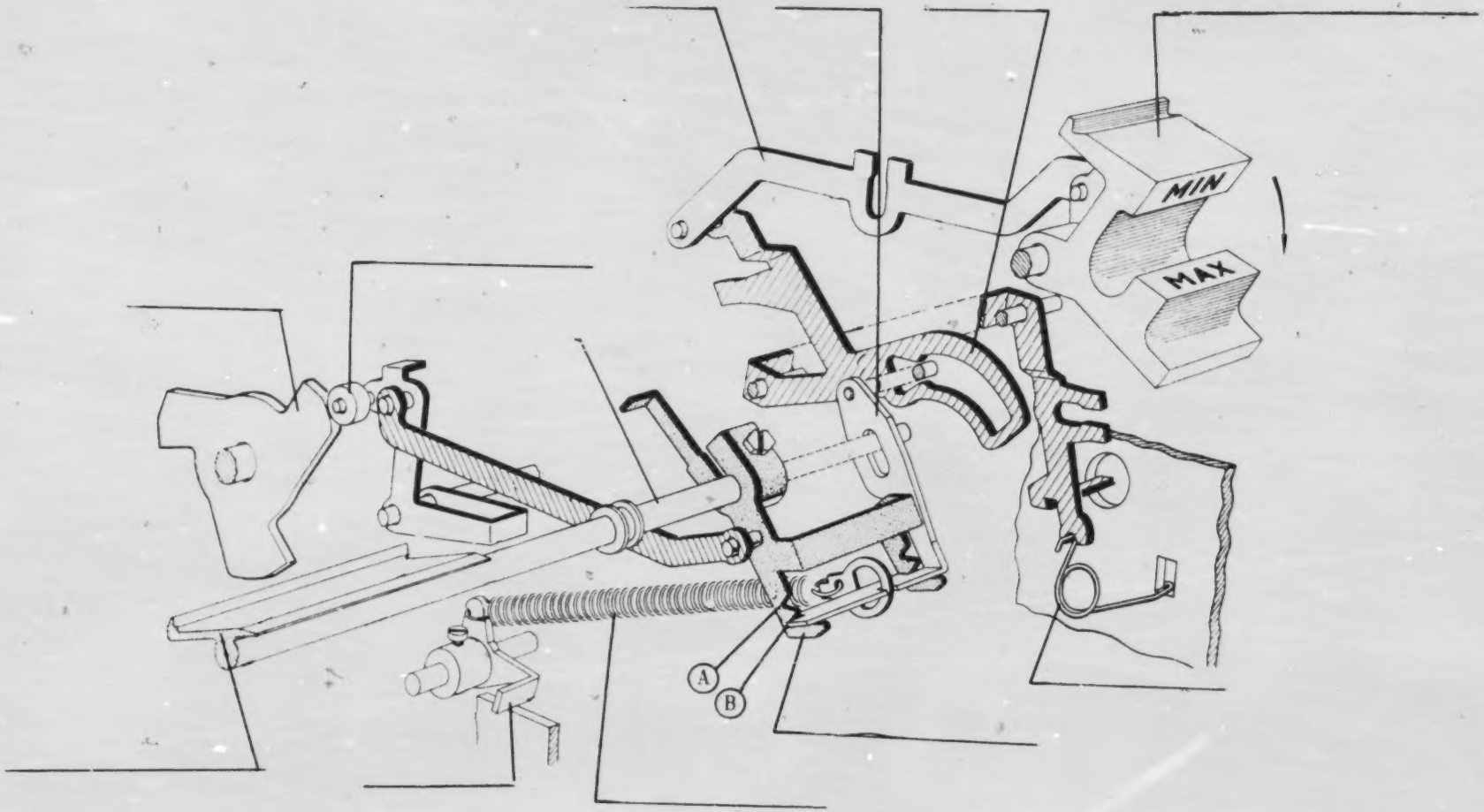
COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE OBJECTIVE NO. 17.0 Impression Control Mechanism

The student will disassemble, identify and reassemble the impression control mechanism of an Olivetti electric typewriter with 75% accuracy as judged by rating scale.

Selecting tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		17.0	Disassemble, identify parts and reassemble the impression control mechanism on an Olivetti electric typewriter.
17.1	Given a pictorial chart of the impression control assembly, the student will correctly identify 9 of 11 parts.	17.1	Identify the 11 parts on the attached chart.
17.2	Given an Olivetti electric typewriter, the student will remove and reinstall the impression control mechanism with 75% accuracy.	17.2	Remove and reinstall the impression control mechanism on an Olivetti electric typewriter. You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%



17.1

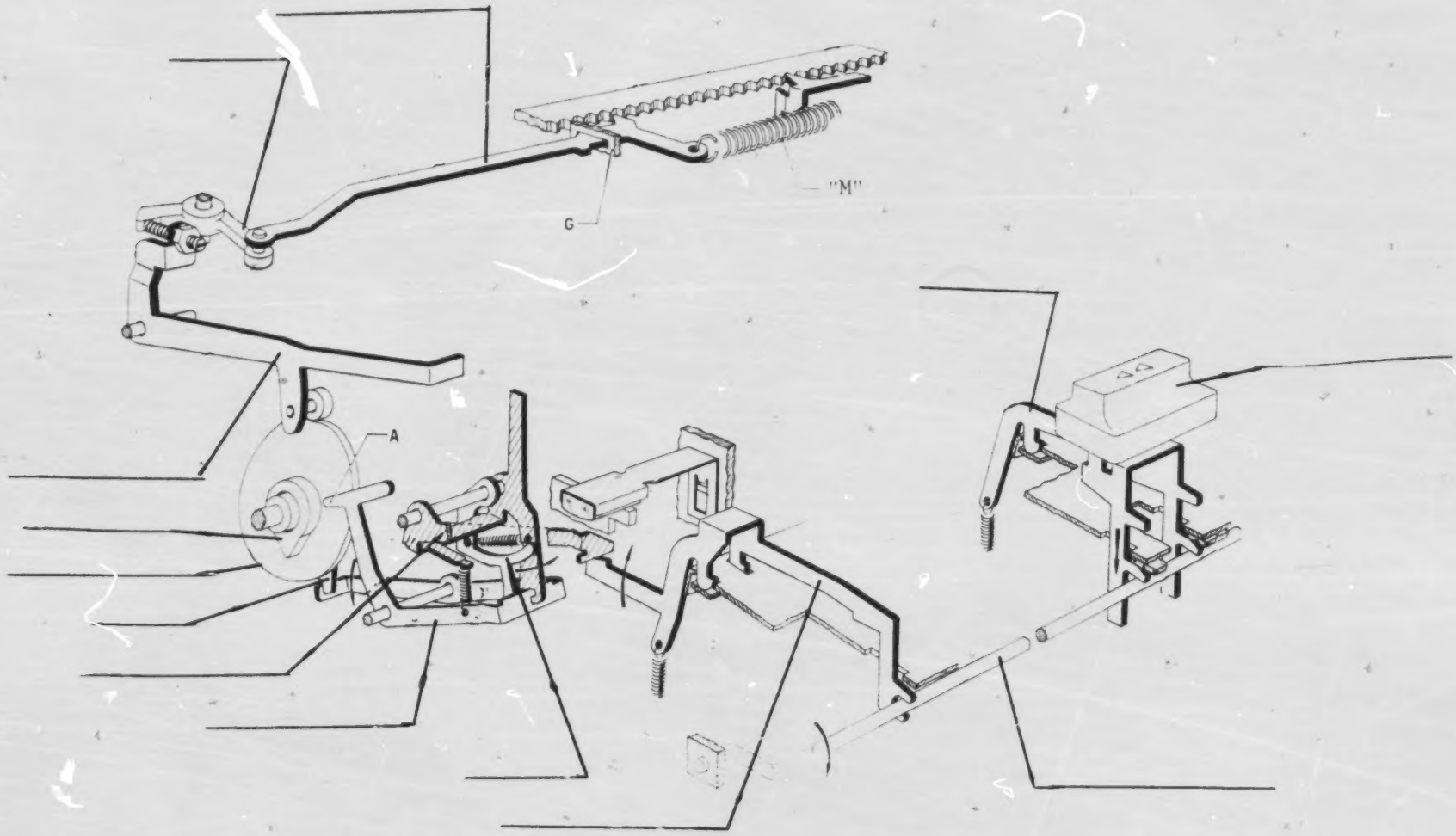
COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE
OBJECTIVE NO. 18.0 Backspace Mechanism

The student will disassemble, identify and reassemble the backspace mechanism of an Olivetti electric typewriter with 75% accuracy as judged by rating scale.

Selecting tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		18.0	Disassemble, identify parts and reassemble the backspace mechanism of an Olivetti electric typewriter.
18.1	Given a pictorial chart of the backspace assembly, the student will correctly identify 8 or 13 parts.	18.1	Identify the 13 parts on the attached chart.
18.2	Given an Olivetti electric typewriter, the student will remove and reinstall the backspace mechanism with 75% accuracy.	18.2	Remove and reinstall the backspace mechanism on an Olivetti electric typewriter. You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%



18.1

COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE OBJECTIVE NO. 19.0 — Input Control

The student will disassemble, identify and reassemble the input control of an Olivetti electric typewriter with 75% accuracy as judged by rating scale.

Selecting tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		19.0	Disassemble, identify parts and reassemble the input control of an Olivetti electric typewriter.
19.1	Given a pictorial chart of the input control assembly, the student will correctly identify 7 of 10 parts.	19.1	Identify the 10 parts on the attached chart.
19.2	Given an Olivetti electric typewriter, the student will remove and reinstall the input control with 75% accuracy.	19.2	Remove and reinstall the input control mechanism on an Olivetti electric typewriter. You will be graded on the following scale. Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%

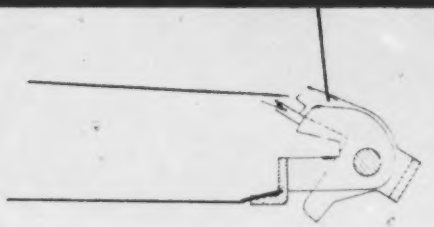


FIGURE 2

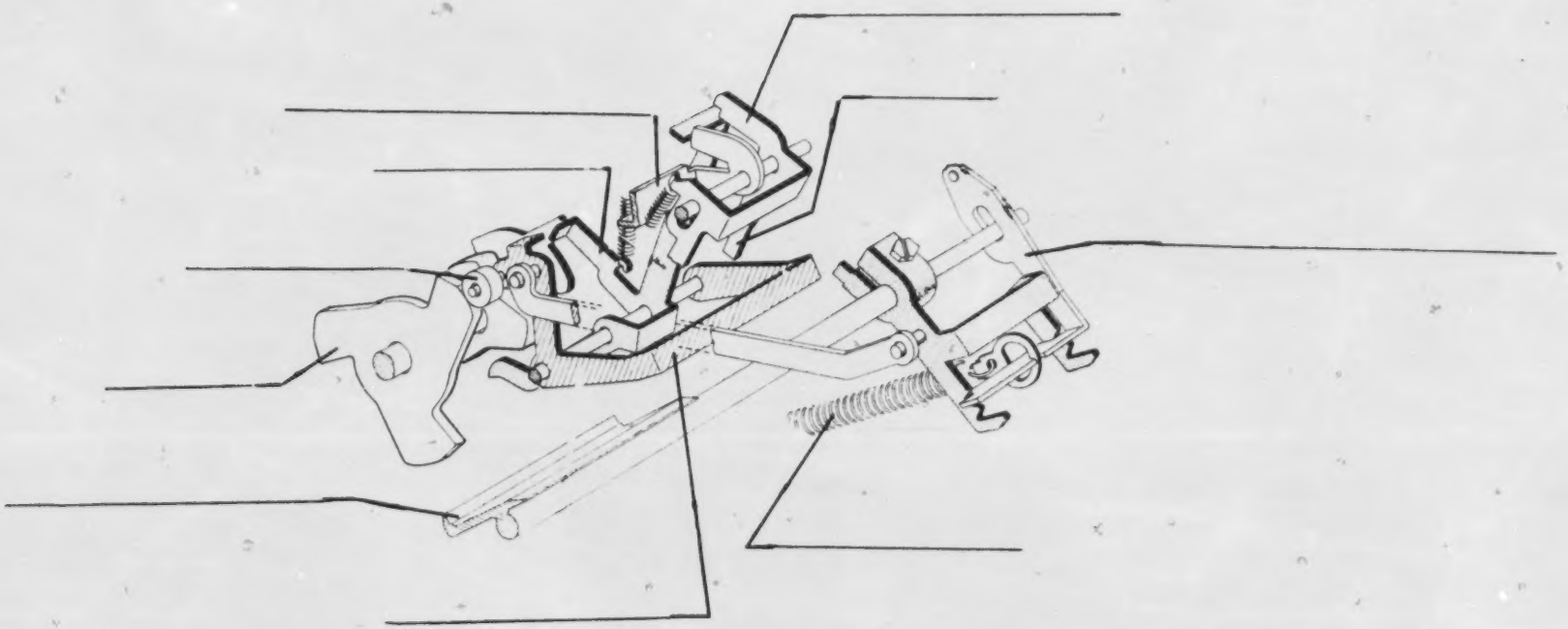


FIGURE 1

19.1

COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE
OBJECTIVE NO. 20.0 Space Bar Mechanism

The student will disassemble, identify and reassemble the space bar mechanism of an Olivetti electric typewriter. The student will remove and reinstall the space mechanism with 75% accuracy as judged by rating scale.

Selecting tools 25%
Accuracy 50%
Speed 10%
Neatness 15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		20.0	Disassemble, identify parts and reassemble the space bar mechanism of an Olivetti electric typewriter.
20.1	Given a pictorial chart of the space bar assembly, the student will correclty identify 8 of 12 parts.	20.1	Identify the 12 parts on the attached chart.
20.2	Given an Olivetti electric typewriter, the student will remove and reinstall the space bar mechanism with 75% accuracy.	20.2	Remove and reinstall the space bar mechanism on an Olivetti electric typewriter. You will be graded on the following scale: Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%

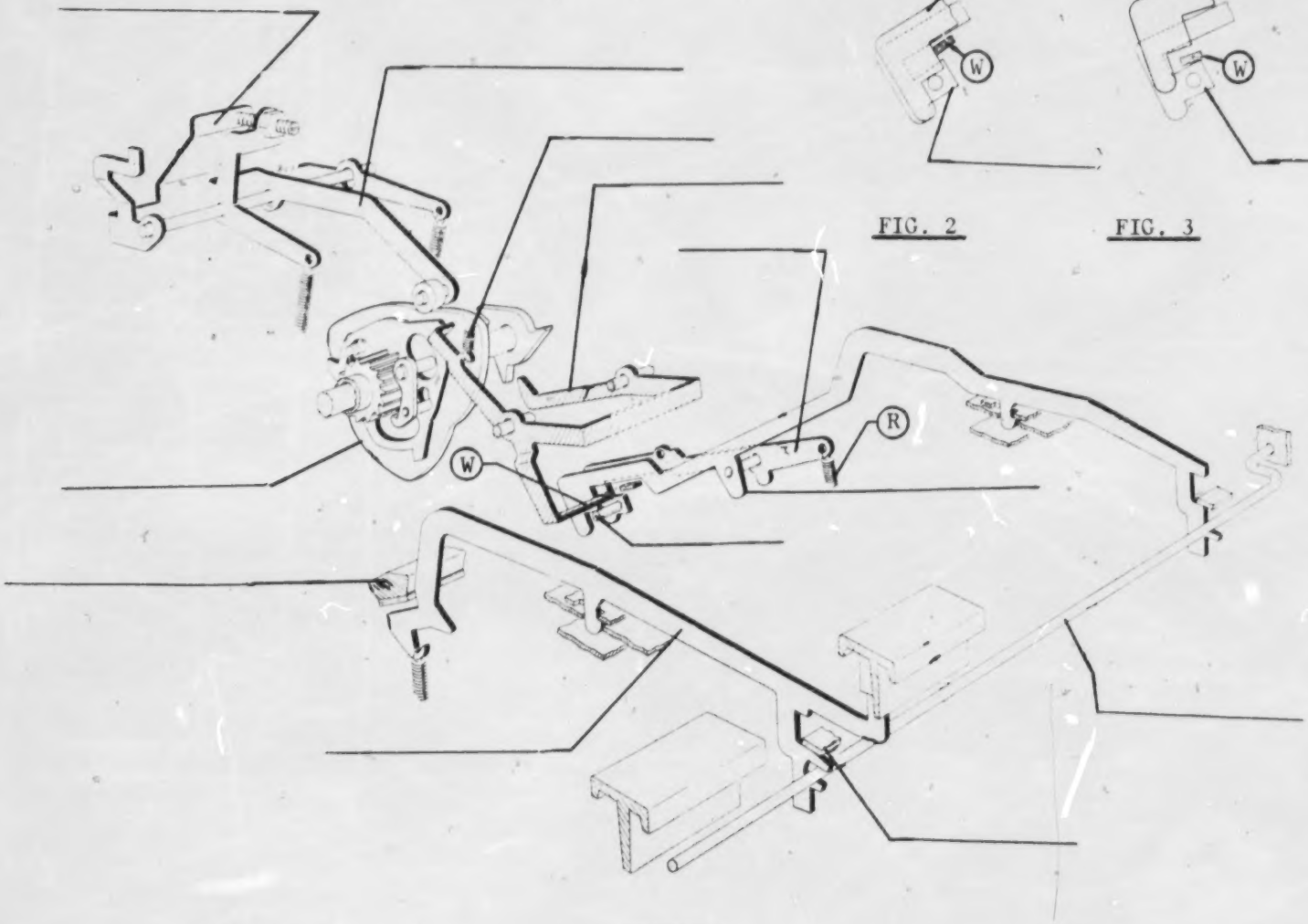


FIGURE 1

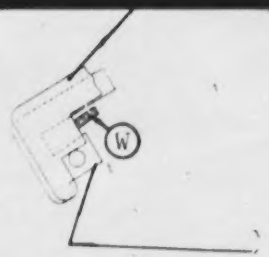


FIG. 2

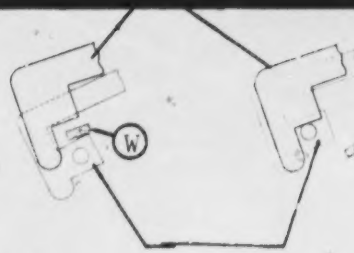


FIG. 3

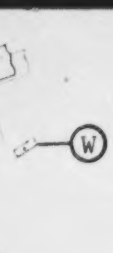


FIG. 4

20.1

COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE OBJECTIVE NO. 21.0 Carriage Tabulation Mechanism

The student will disassemble, identify and reassemble the carriage tabulation mechanism of an Olivetti electric typewriter with 75% accuracy as judged by rating scale.

Selecting tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		21.0	Disassemble, identify parts and reassemble the carriage tabulation mechanism of an Olivetti electric typewriter.
21.1	Given a pictorial chart of the tabulation assembly, the student will correctly identify 15 of 19 parts.	21.1	Identify the 19 parts on the attached chart.
21.2	Given an Olivetti electric typewriter, the student will remove and reinstall the tabulation mechanism with 75% accuracy.	21.2	Remove and reinstall the tabulation mechanism on an Olivetti electric typewriter. You will be graded on the following scale. Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%

21.1

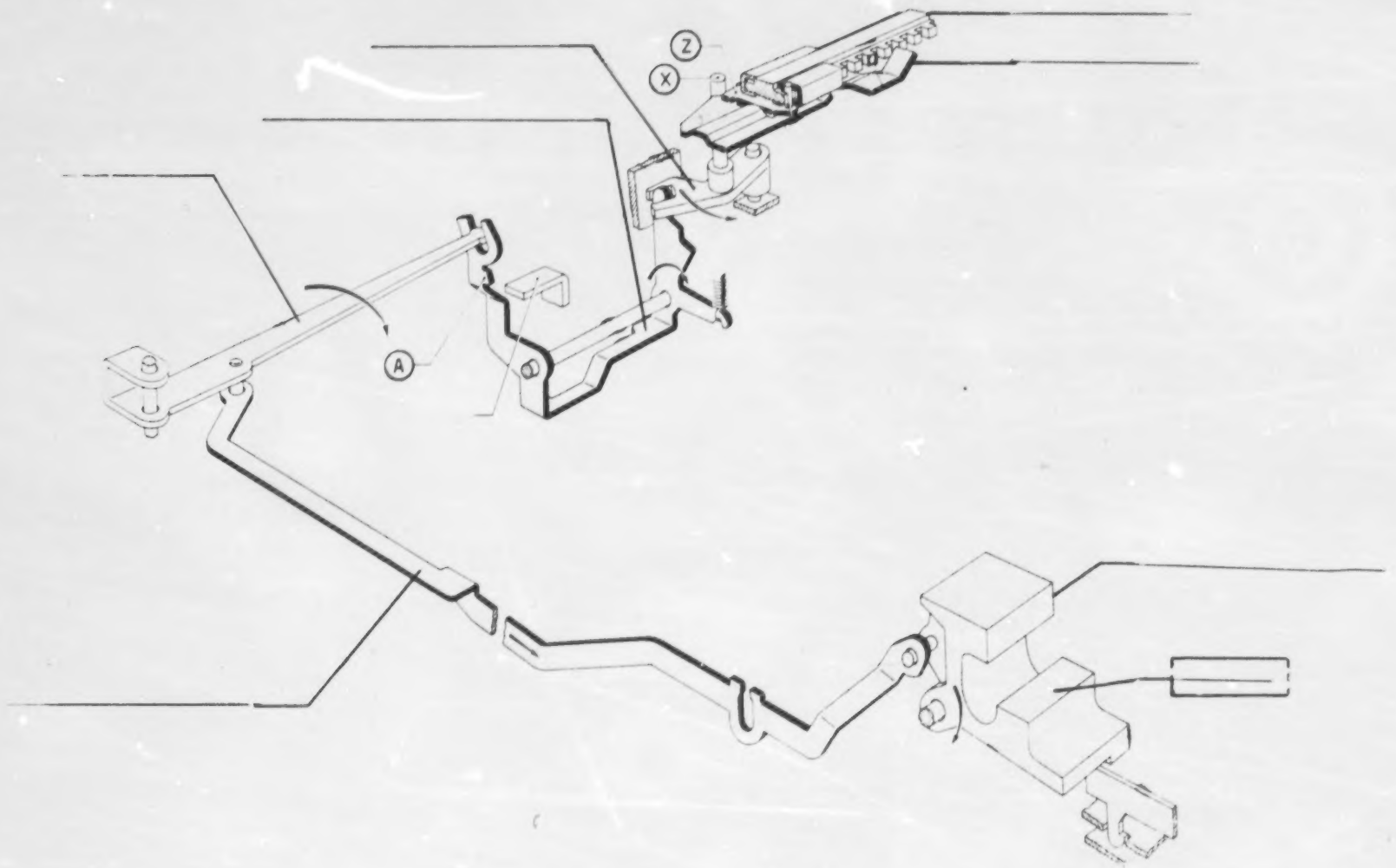
COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE
OBJECTIVE NO. 22.0 Electric Margin

The student will disassemble, identify and reassemble the electric margin of an Olivetti electric typewriter with 75% accuracy as judged by rating scale.

Selecting tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		22.0	Disassemble, identify parts and reassemble the electric margin of an Olivetti electric typewriter.
22.1	Given a pictorial chart of the electric margin assembly, the student will correctly identify 8 of 12 parts.	22.1	Identify the 12 parts on the attached chart.
22.2	Given an Olivetti electric typewriter, the student will remove and reinstall the electric margin with 75% accuracy.	22.2	Remove and reinstall the electric margin on an Olivetti electric typewriter. You will be graded on the following scale. Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%



22.1

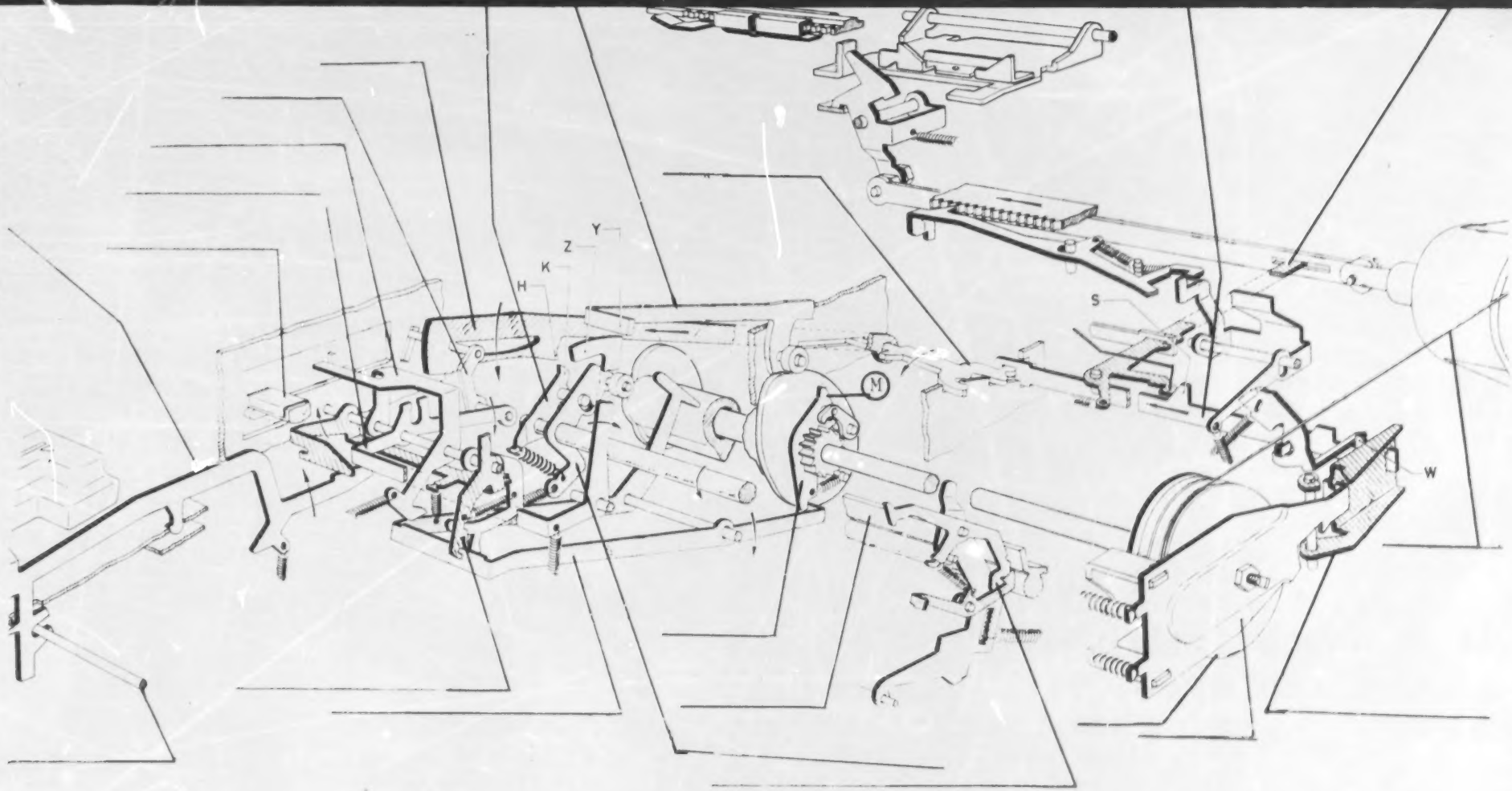
COURSE: BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE
OBJECTIVE NO. 23.0 Carriage Return Mechanism

The student will disassemble, identify and reassemble the carriage return mechanism of an Olivetti electric typewriter with 75% accuracy as judged by rating scale.

Selecting tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
		23.0	Disassemble, identify parts and reassemble the carriage return mechanism on an Olivetti electric typewriter.
23.1	Given a pictorial chart of the carriage return assembly, the student will correctly identify 21 of 30 parts.	23.1	Identify the 30 parts on the attached chart.
23.2	Given an Olivetti electric typewriter, the student will remove and reinstall the carriage return mechanism with 75% accuracy.	23.2	Remove and reinstall the carriage return mechanism on an Olivetti electric typewriter. You will be graded on the following scale. Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%



23.1

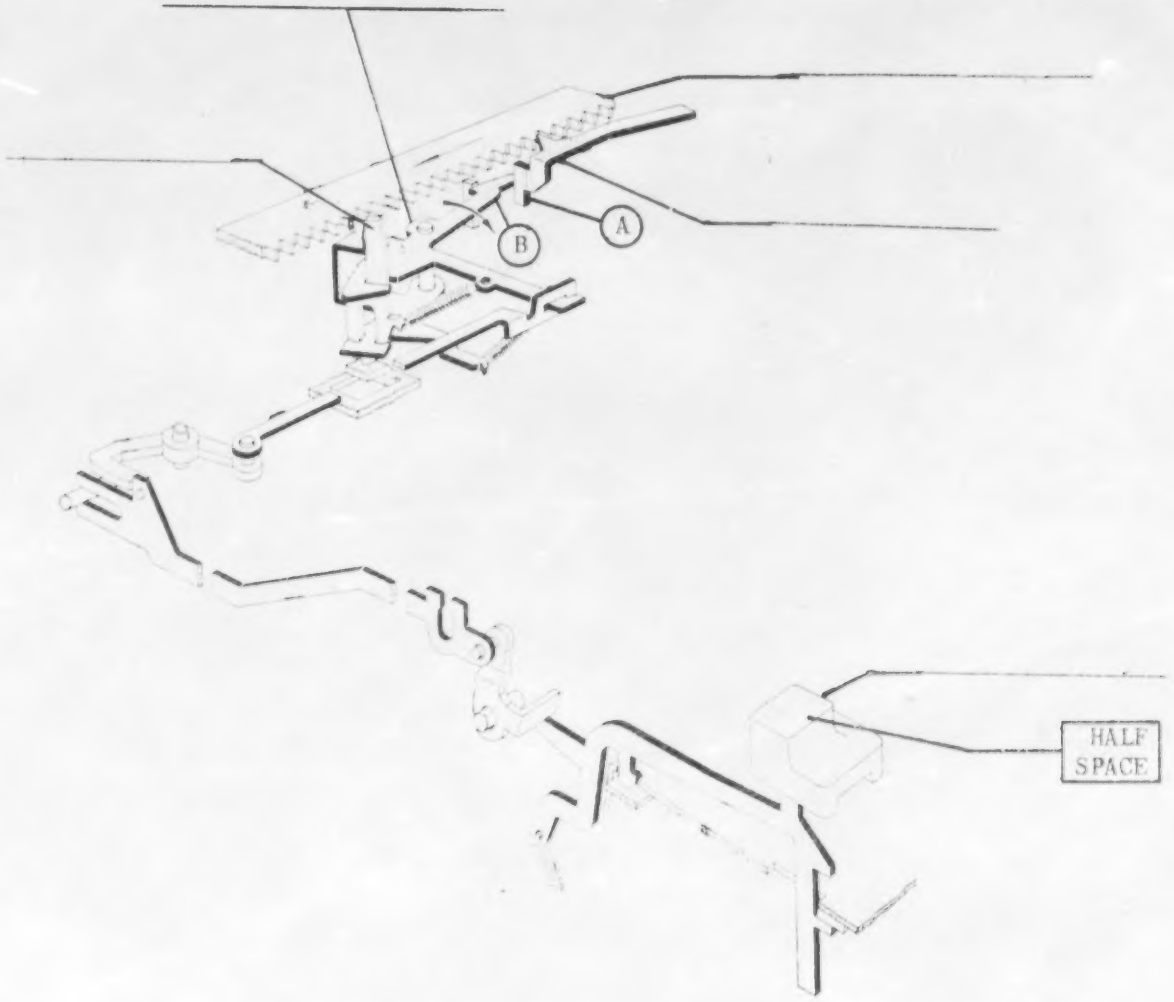
COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE
OBJECTIVE NO. 24.0 Half Spacing

Upon completion of the half spacing unit of instruction, the student will answer 75% of the attached I.P.O. criterion tests correctly. In addition, the student will disassemble, identify and reassemble the half space mechanism of an Olivetti electric typewriter with 75% accuracy as judged by rating scale.

Selecting tools 25% Speed 10%
Accuracy 50% Neatness 15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
24.1	Given a pictorial chart of the half space assembly, the student will correctly identify 5 of 7 parts.	24.1	Identify the 7 parts on the attached chart.
24.2	Given an Olivetti electric typewriter, the student will remove and reinstall the half space mechanism with 75% accuracy.	24.2	Remove and reinstall the half space mechanism on an Olivetti electric typewriter. You will be graded on the following scale. Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%



78

24.1

77

COURSE BUSINESS MACHINE MAINTENANCE-BASIC

TERMINAL PERFORMANCE
OBJECTIVE NO. 25.0 Troubleshooting

Given an Olivetti electric typewriter, the student will diagnose, troubleshoot, and restore to proper operating condition 15 designated malfunctions within 75% accuracy as judged by rating scale. The criterion measure of the T.P.O. is contained in the I.P.O. measures.

Selecting tools	25%
Accuracy	50%
Speed	10%
Neatness	15%

NO.	INTERMEDIATE PERFORMANCE OBJECTIVES	NO.	CRITERION MEASURES
25.0	On each of the I.P.O.'s below: Given an Olivetti electric typewriter with a specified malfunction, the student will troubleshoot, repair, adjust and/or replace parts within 75% accuracy as judged by rating scale.	25.0	On the Olivetti electric typewriter assigned you, troubleshoot and repair as needed each of the specified malfunctions below to bring the machine back to operating condition.
25.1	Failure to print.	25.1	Correct "failure to print".
25.2	Motor will not run.	25.2	Correct "motor will not run".
25.3	Repeating keys.	25.3	Correct "repeating keys".
25.4	Faint print.	25.4	Correct "faint print".
25.5	Failure to space.	25.5	Correct "failure to space".
25.6	Ribbon lift height.	25.6	Correct "ribbon lift height".
25.7	Ribbon reverse.	25.7	Correct "ribbon reverse".
25.8	Skipping.	25.8	Correct "skipping".
25.9	Motion.	25.9	Correct "motion".
25.10	Type off feet.	25.10	Correct "type off feet".
25.11	Ring and platen.	25.11	Correct "ring and platen".
25.12	Space bar repeat.	25.12	Correct "space bar repeat".
25.13	Backspace.	25.13	Correct "backspace".
25.14	Banking.	25.14	Correct "banking".
25.15	Carriage return.	25.15	Correct "Carriage return".
			Selection of tools 25% Accuracy 50% Speed 10% Neatness 15%